ORDER NO. KM40310268C3

Service Manual

Telephone Equipment

KX-TC2000SNB / KX-TC2000SNS

Cordless Phone

Black Version

Silver Version

(for Singapore)

(Handset) (Base Unit)

SPECIFICATIONS

SPECIFICATIONS

General

Modulation:	FM, 5kHz Deviation	Pause:	3.5 seconds per pause
Frequency Stability:	± 2.5 kHz	Memory Capacity:	10 telephone numbers, up to 16 digits per station
Dial Type:	Tone (DTMF)/ Pulse		
Redial:	Last dialed number each time the Redial button is pressed		

	Base Unit	Handset
Power Source:	AC adaptor PQLV16BXZ (DC 12 V)	Built-in rechargeable Ni-Cd battery
(Receiver Section)		
Receiving Frequency:	10 channels within 49.67 to 49.99 MHz	10 channels within 46.61 to 46.97 MHz
Adjacent Channel Rejection:	40 dB	40 dB
Sensitivity:	1dBμV for 20 dB S/N	2 dBμV for 20 dB S/N
(Transmitter Section)		
Transmitting Frequency:	10 channels within 46.61 to 46.97 MHz	10 channels within 49.67 to 49.99 MHz
Jacks:	DC IN, Telephone line	
Antenna:	Telescopic	Rubber Flexible
Speaker:		$1^{3}/_{16}$" (3 cm) dynamic
Microphone:		Condenser microphone
Power Consumption:	Stand by: Approx. 5w Maximum: Approx. 7w	
Dimensions (H X W X D):	$3^{5}/_{32}$" × $4^{29}/_{32}$" × $8^{9}/_{32}$" (80 × 125 × 210mm)	$10^{15}/_{16}$" × $2^{1}/_{8}$" × $1^{3}/_{16}$" (278 × 54 × 40mm)
Weight:	0.66 lbs. (300 g)	0.42 lbs. (190g) with battery

Design and specifications are subject to change without notice.

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING

If lead free solder was used in the manufacture of this product the printed circuit boards will be marked PbF. Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.

When this mark does appear please read and follow the special instructions described in this manual on the use of PbF and how it might be permissible to use Pb solder during service and repair work.

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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

When you note the serial number, write down all 11 digits. The serial number may be found on the bottom of the unit.

FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.
When repairing, the following precautions will help prevent recurring malfunctions.
1. Cover plastic parts boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on worktable.
4. Do not grasp IC or LSI pins with bare fingers.

Panasonic

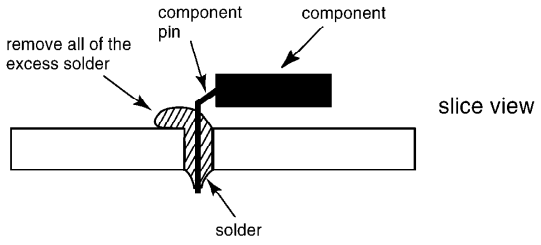
1. ABOUT LEAD FREE SOLDER (PbF: Pb free)

Note:

In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.
We will use PbF solder when discussing the lead free solder used in our manufacturing process which is made from Tin (Sn), Silver (Ag), and Copper (Cu).
This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder although, with some precautions, standard Pb solder can also be used.

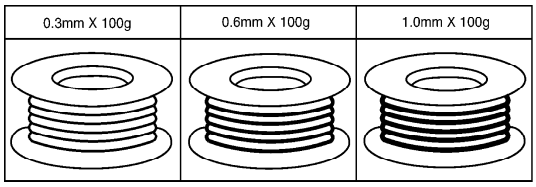
Caution

- **PbF solder has a melting point that is 50°F ~ 70° F (30°C ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700°F ± 50° F (370°C ± 10°C). In case of using high temperature soldering iron, please be careful not to heat too long.**
- **PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F (600°C).**
- **If you must use Pb solder on a PCB manufactured using PbF solder, remove as much of the original PbF solder as possible and be sure that any remaining is melted prior to applying the Pb solder.**
- **When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See the figure below).**



1.1. Suggested PbF Solder

There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper (Sn+Ag+Cu), you can also use Tin and Copper (Sn+ Cu), or Tin, Zinc, and Bismuth (Sn+Zn+Bi). Please check the manufac turer's specific instructions for the melting points of their products and any precautions for using their product with other materials.
The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.



1.2. How to recognize that Pb Free solder is used

1.2.1. Base Unit Main PCB

(Component View)

Note:
The location of the "PbF" marks is subject to change without notice.

1.2.2. Handset PCB

(Component View)

Note:
The location of the "PbF" marks is subject to change without notice.

2. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.
When repairing, the following precautions will help prevent recurring malfunctions.

1. Cover plastic parts boxes with aluminum foil.

2. Ground the soldering irons.

3. Use a conductive mat on worktable.

4. Do not grasp IC or LSI pins with bare fingers.

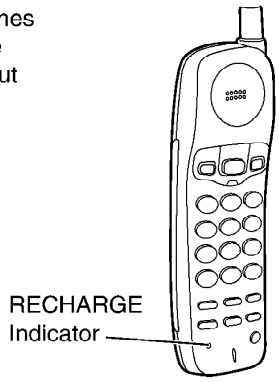
3. CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's Instructions.

4. BATTERY

4.1. Recharge

When the RECHARGE indicator flashes or the unit beeps intermittently, place the handset on the base unit for about 15 hours to recharge the battery.



4.2. Battery information

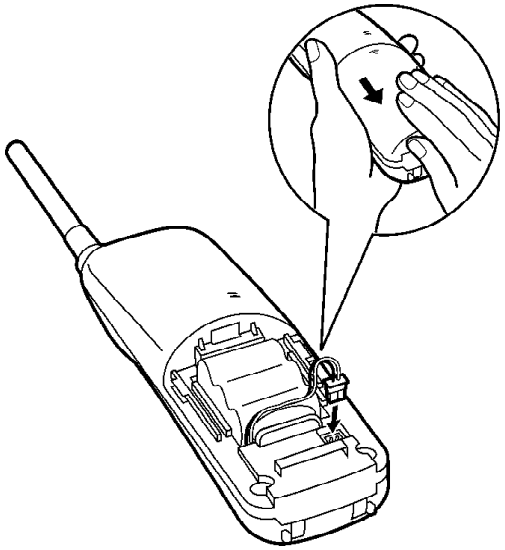
After your Panasonic battery is fully charged:

Operation	Operating time
While in use (TALK)	Up to about 5 hours
While not in use (Standby)	Up to about 14 days

- The battery operating time may be shortened depending on usage conditions and ambient temperature.
- **Clean the handset and the base unit charge contacts with a soft, dry cloth. Clean if the unit is subject to grease, dust or humidity.** Otherwise the battery may not charge properly.
- If the battery is fully charged, you do not have to place the handset on the base unit until the RECHARGE indicator flashes. This will maximize the battery life.
- The battery cannot be overcharged.

5. BATTERY REPLACEMENT

If the RECHARGE indicator flashes after being fully charged, replace the battery with a new Panasonic P-P301 (KX-A36A) battery.
When repalcing the battery, programmed information may be erased. Reprogram if necessary.



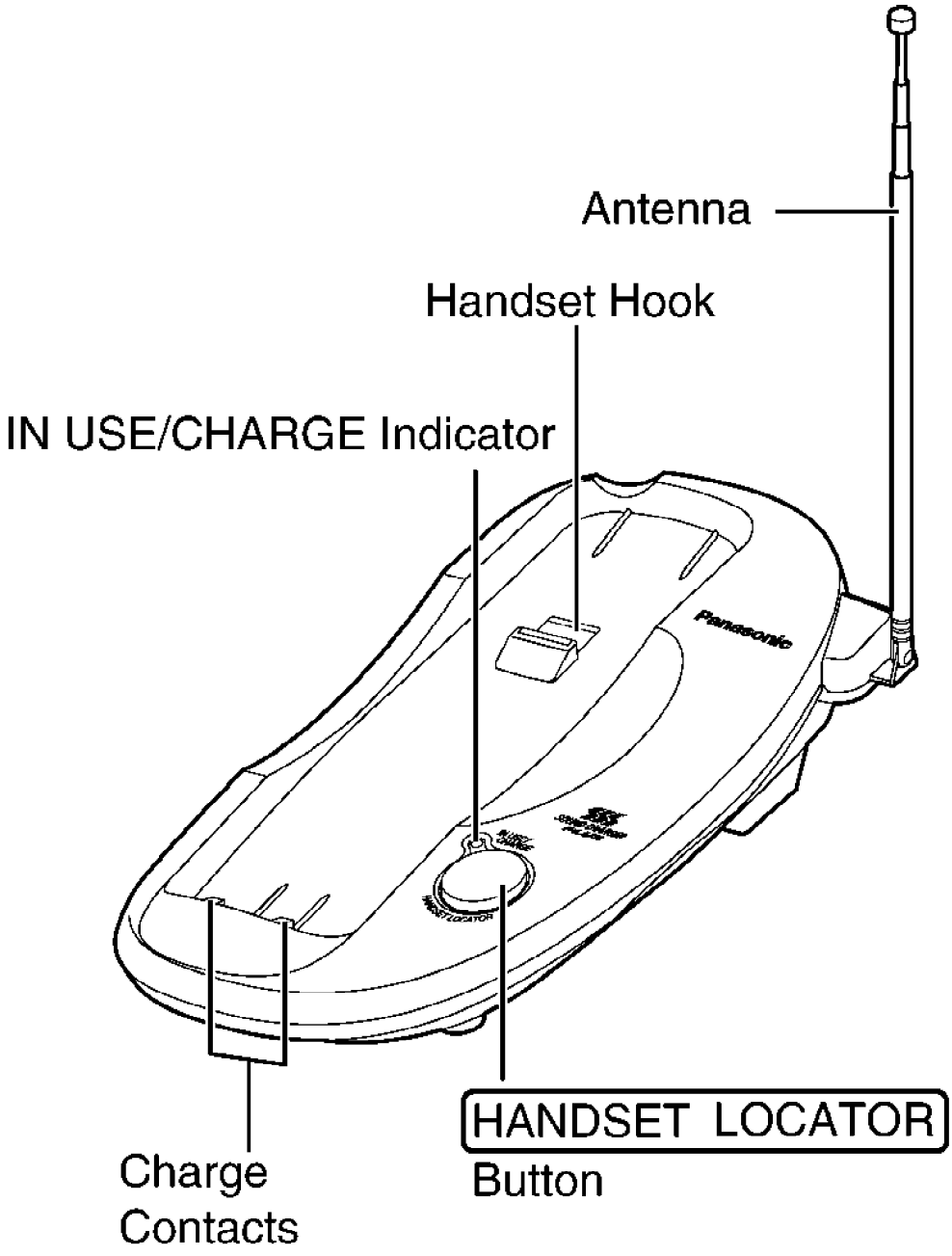
1 Press the notch on the battery cover firmly and slide it as indicated by the arrow.

2 Replace the battery and close the cover.

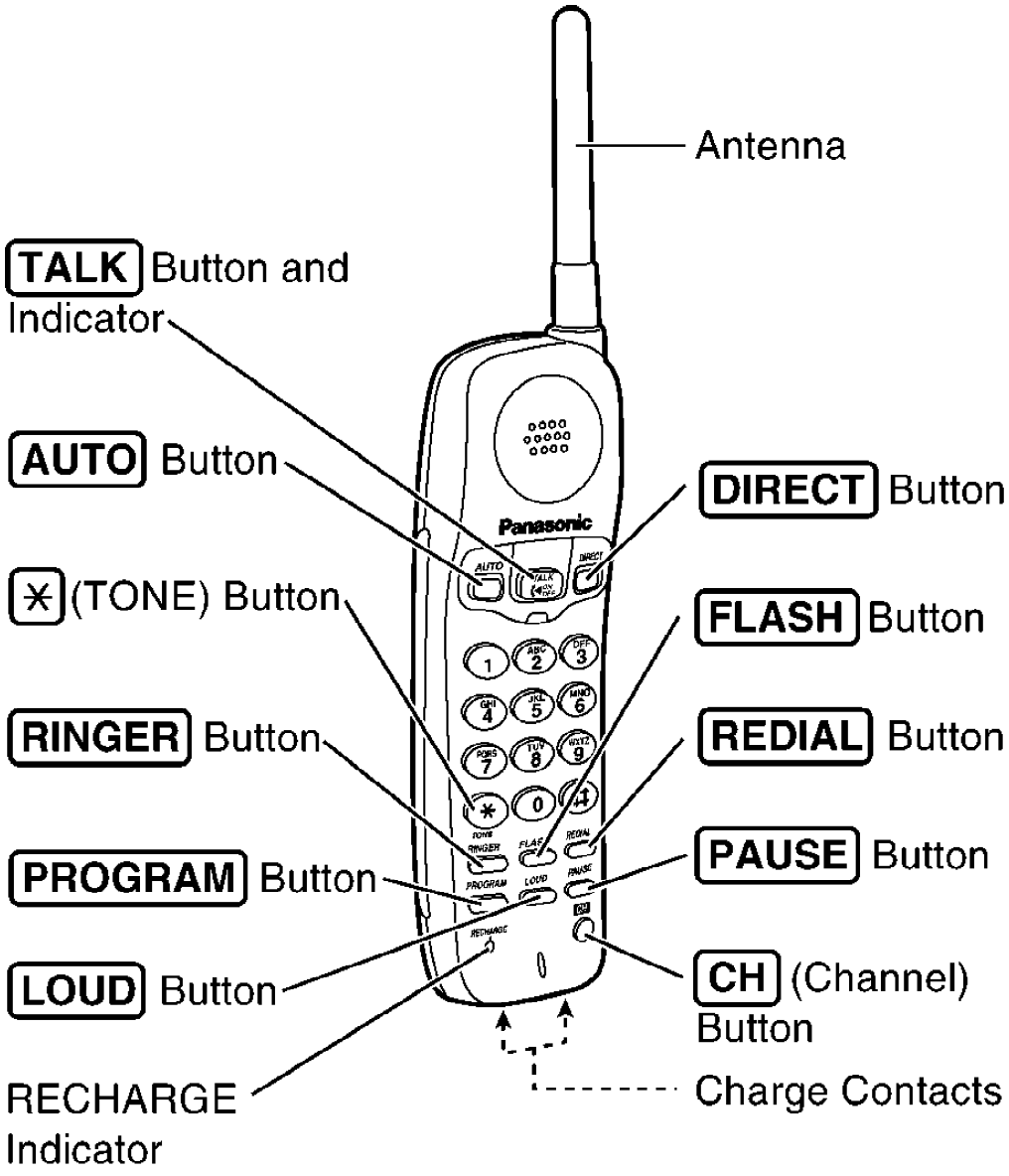
3 Make sure to charge the new battery for about 15 hours.

6. LOCATION OF CONTROLS

6.1. Base Unit

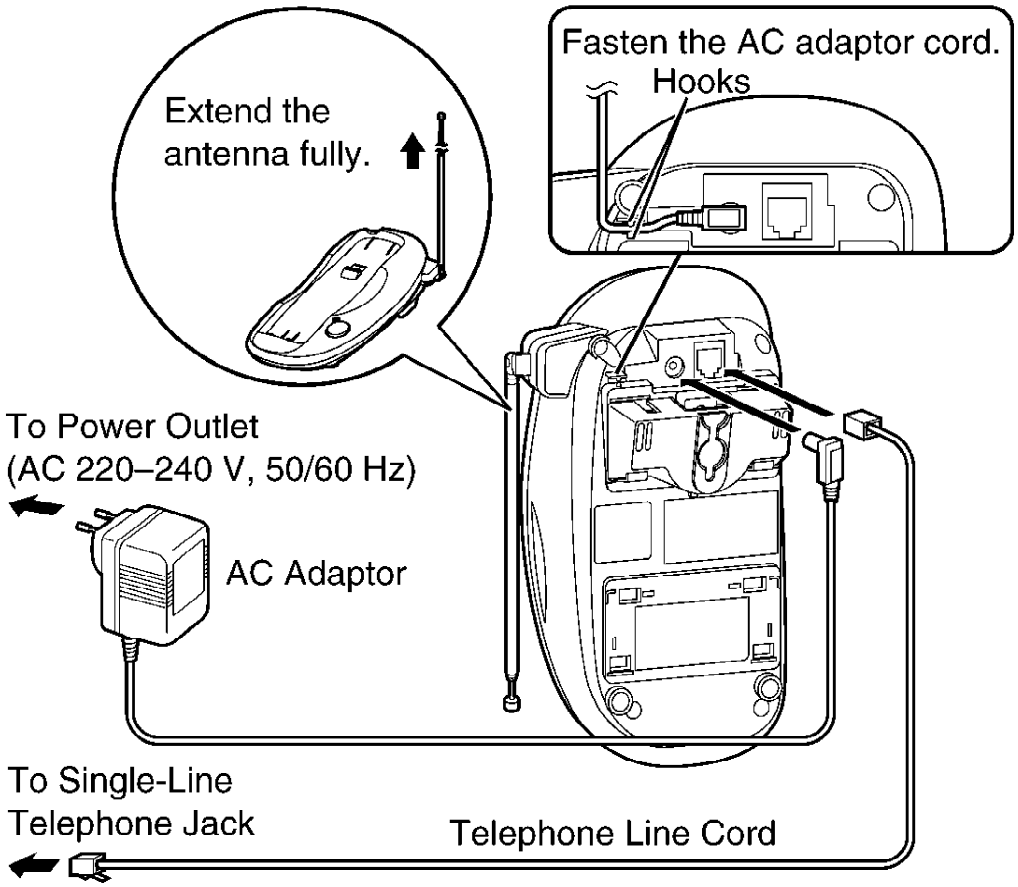

Antenna
Handset Hook
IN USE/CHARGE Indicator
Panasonic
HANDSET LOCATOR
Button
Charge
Contacts

6.2. Handset



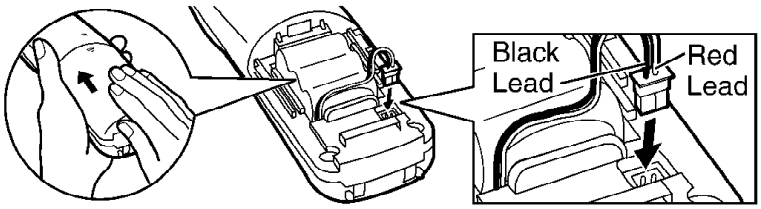
7. CONNECTION

1 Connect as shown.



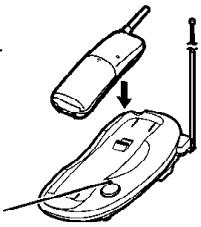
- USE ONLY WITH Panasonic AC ADAPTOR PQLV16BXZ.
- The AC adaptor must remain connected at all times.
(It is normal for the adaptor to feel warm during use.)
- This unit will not function during a power failure. If you want to connect a standard telephone on the same line, use a T-adaptor.

2 Install the battery in the handset, and close the handset cover, locking it into place.



STOP 3 Charge the battery for about 15 hours.

• The IN USE/CHARGE indicator lights.



To select the dialing mode TONE (preset) or PULSE

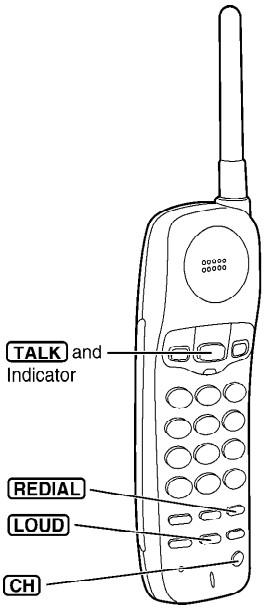
The TALK indicator light must be off before programming.

Press PROGRAM ➡ AUTO ➡ # twice (PULSE) OR * twice (TONE) ➡ PROGRAM.

- A beep sounds.
- To cancel during programming, press PROGRAM, then restart from the beginning.
- If 3 beeps sound during programming, a wrong key was pressed. Start again from the beginning.

8. OPERATIONS

8.1. Making Calls



1 Press TALK.
- The TALK indicator lights.

2 Dial a phone number.

3 To hang up, press TALK or place the handset on the base unit.
- The indicator light goes out.

To redial the last number dialed

Press TALK ➡ REDIAL.

To select the handset receiver volume

Press LOUD while talking.
- Each time you press the button, the volume level will change to LOW (preset) or HIGH.

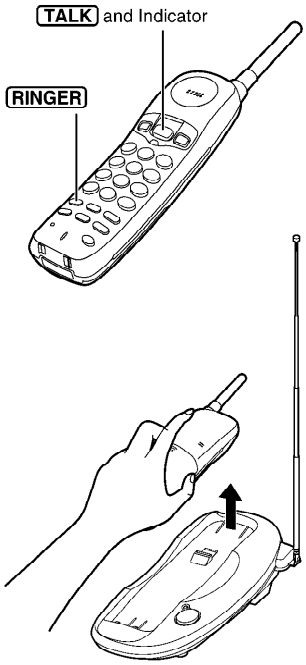
If noise interferes with the conversation

Press CH to select a clearer channel or move closer to the base unit.

Lighted handset keypad

The handset dialing buttons will light when you press a button or lift the handset off the base unit, or when a call is received. The lights will go out about a few seconds after pressing a button, lifting the handset or answering a call.

8.2. Answering Calls



If the handset is off the base unit, press TALK.
- You can also answer a call by pressing any dialing button 0 to 9, * or # (—**Any Key Talk**).

OR

If on the base unit, just lift up.

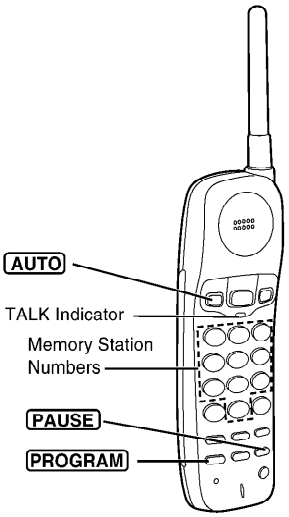
Selecting the ringer volume

The TALK indicator light must be off.

- **To select HIGH (preset) or LOW,** press RINGER.
  Each time you press the button, the ringer volume will change and the selected volume will ring.
- **To turn the ringer OFF,** press and hold RINGER until a beep sounds.
- **To turn the ringer ON,** press RINGER.

8.3. Storing Phone Numbers in Memory

You can store up to 10 phone numbers. The dialing buttons (0) to (9) function as memory stations.
The TALK indicator light must be off before programming.



1 Press PROGRAM.
- The TALK indicator flashes.

2 Enter a phone number up to 16 digits.

3 Press AUTO.

4 Press a memory station number (0 to 9).
- A beep sounds.
- To store other numbers, repeat steps 1 through 4.

- If a pause is required for dialing, press PAUSE where needed. Pressing PAUSE counts as one digit.

If you misdial

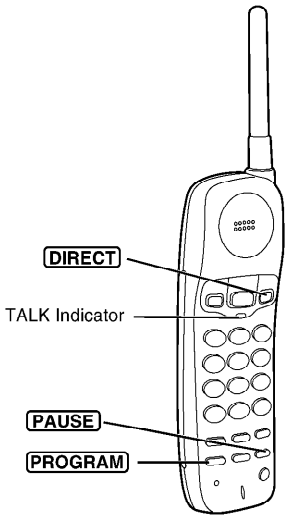
Press PROGRAM to end storing. ➡ ➡ Start again from step 1.

To erase a stored number

Press PROGRAM ➡ AUTO ➡ ➡ the memory station number (0 to 9) for the phone number to be erased.
- A beep sounds.

8.4. Storing a Phone Number in the DIRECT Button

A phone number stored in the DIRECT button can be dialed with a one-touch operation.
The TALK indicator light must be off before programming.



1 Press PROGRAM.
- The TALK indicator flashes.

2 Enter a phone number up to 16 digits.

3 Press DIRECT.
- A beep sounds.

- If a pause is required for dialing, press PAUSE where needed. Pressing PAUSE counts as one digit.

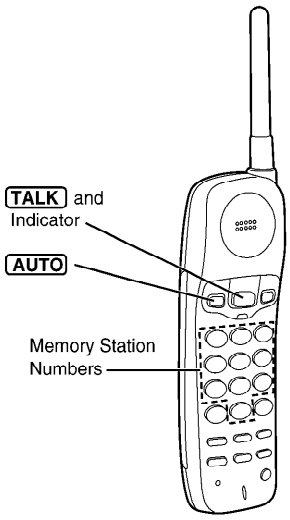
If you misdial

Press PROGRAM to end storing. ➡ ➡ Start again from step 1.

To erase a stored number

Press PROGRAM ➡ DIRECT.
- A beep sounds.

8.5. Dialing a Stored Number

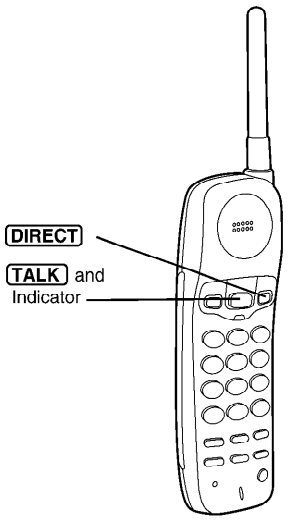


1 Press TALK.
- The TALK indicator lights.

2 Press AUTO.
- The TALK indicator flashes.

3 Press the memory station number (0 to 9).
- The stored number is dialed.

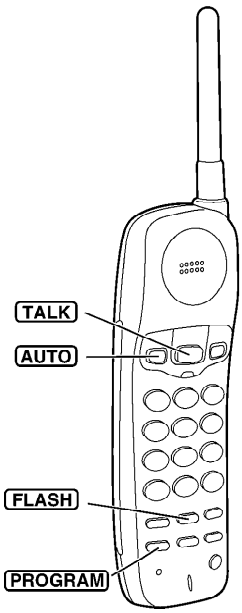
8.6. Dialing the Stored Number in the DIRECT Button



1 Press TALK.
- The TALK indicator lights.

2 Press DIRECT.
- The stored number is dialed.

8.7. Flash Button



Pressing [FLASH] allows you to use special features of your host PBX such as transferring an extension call or accessing optional telephone services, such as call waiting.

Selecting the flash time

The flash time depends on your telephone exchange or host PBX. You can select the following flash times; "90, 100, 110, 250, 300, 400, 600 or 700 msec (milliseconds)". Your phone comes from the factory set to "700 msec".

The TALK indicator light must be off before programming.

Press [PROGRAM] ➡ Dialing button ([1] to [8]) ➡ [AUTO] ➡ ➡ [FLASH] .

[1]: 90 msec [2]: 100 msec [3]: 110 msec
[4]: 250 msec [5]: 300 msec [6]: 400 msec
[7]: 600 msec [8]: 700 msec

- A beep sounds.
- If 3 beeps sound after programming, a wrong key was pressed. Start again from the beginning.
- If the unit is connected via a PBX, PBX functions (transferring a call etc.) might not work correctly. Consult your PBX supplier for the correct setting.

9. DISASSEMBLY INSTRUCTIONS

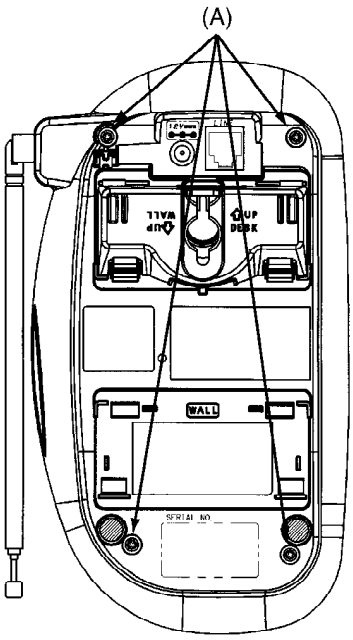
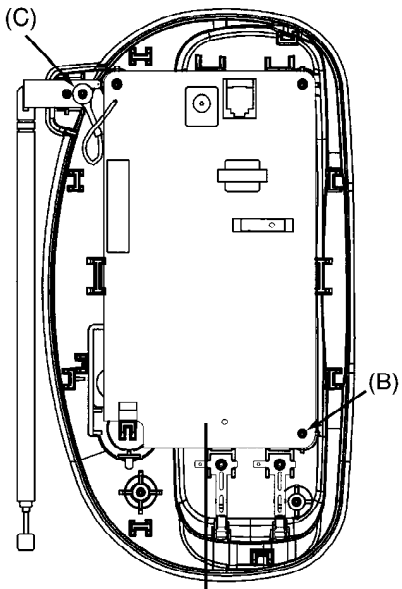


Fig. 1



Remove the P.C.Board.

Fig. 2

Show in Fig.	Procedure	To remove.	Remove.
1	1	Lower Cabinet	Screws (2.6 × 12)..... (A) × 4
2	1, 2	Main P.C. Board	Screw (2.6 × 6)..... (B) × 1
			Screw (2.6 × 12)..... (C) × 1
			Solder
			Main P.C. Board.

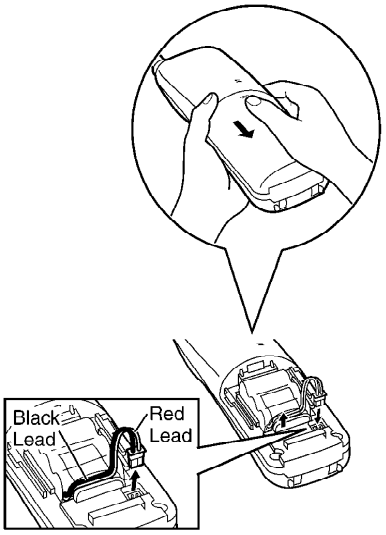


Fig. 3

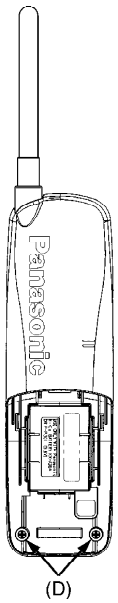


Fig. 4

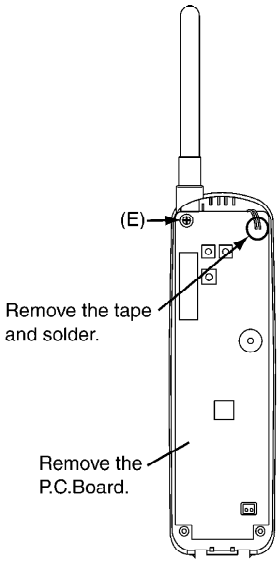


Fig. 6

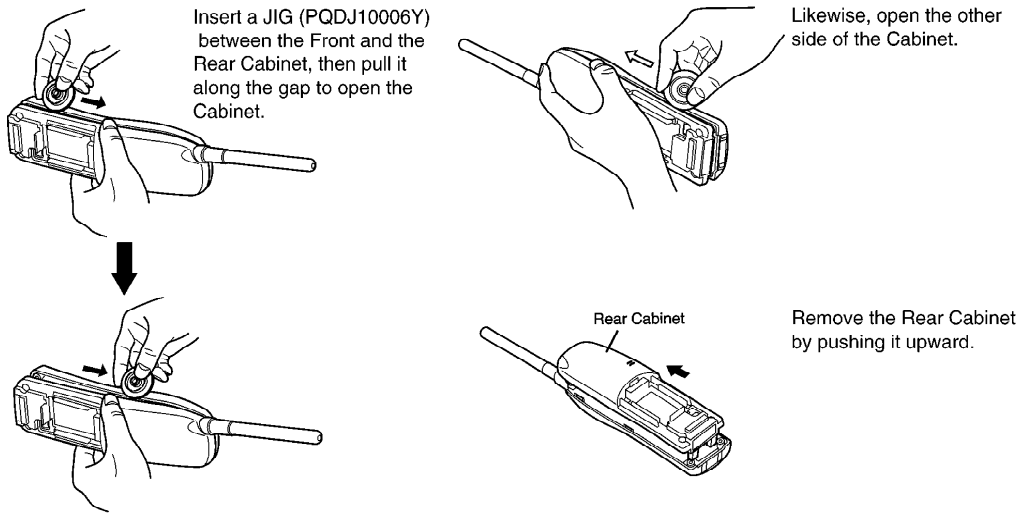
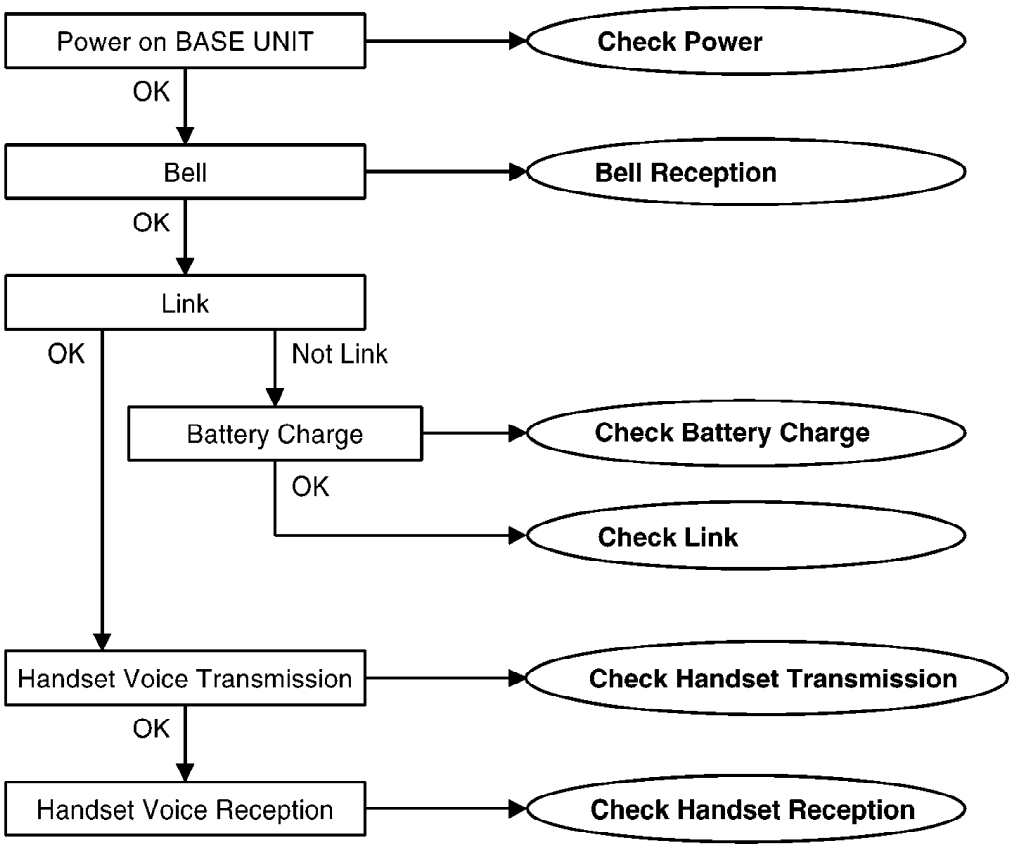

Insert a JIG (PQDJ10006Y) between the Front and the Rear Cabinet, then pull it along the gap to open the Cabinet.
Likewise, open the other side of the Cabinet.
Rear Cabinet
Remove the Rear Cabinet by pushing it upward.

Fig.5

Show in Fig.	Procedure	To remove.	Remove.
3	3	Rear Cabinet	Battery compartment cover.
4	3, 4		Screws (2.6 × 12).....(D) × 2
5	3, 4, 5		Follow the procedure.
6	3, 4, 5, 6	Main P. C. Board	Screw (2.6 × 12).....(E) × 1
			Tape and solder.
			Main P. C. Board.

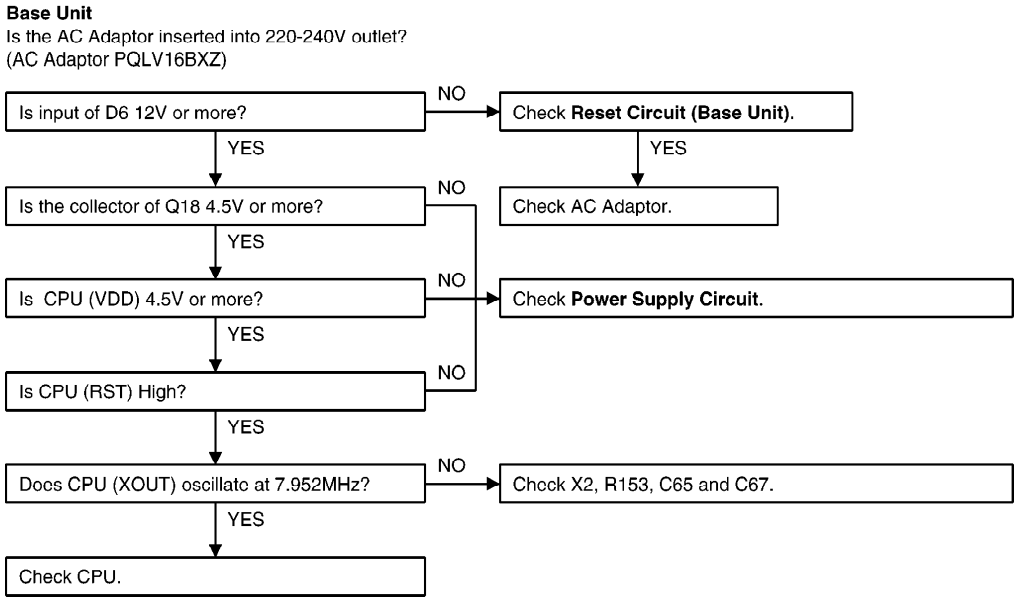
10. TROUBLESHOOTING GUIDE

MAIN



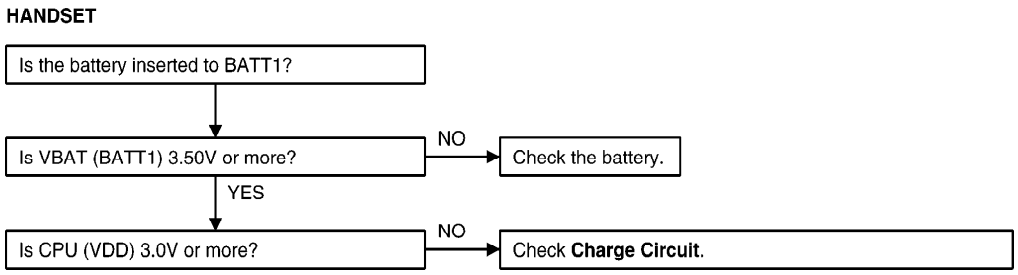
Cross Reference:
Check Power ()
Bell Reception ()
Check Battery Charge ()
Check Link ()
Check Handset Transmission ()
Check Handset Reception ()

10.1. Check Power



Cross Reference:
Reset Circuit (Base Unit) ()
Power Supply Circuit ()

Note:
CPU: IC2



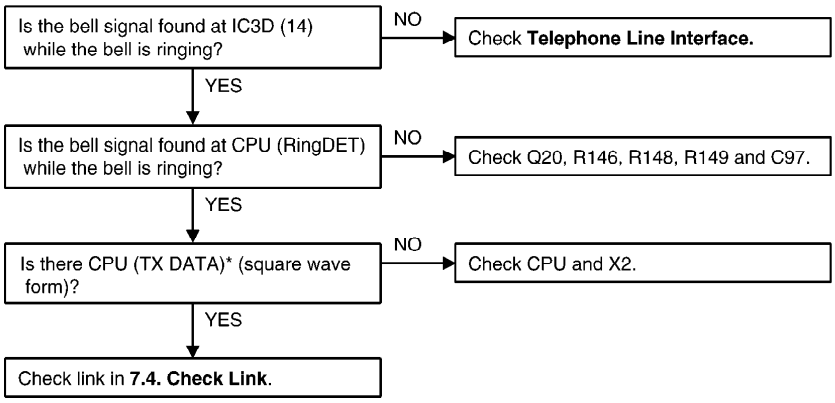
Cross Reference:
Charge Circuit ()

Note:
CPU: IC2

***: Each measurement points are shown in CIRCUIT BOARD (Base Unit) () or CIRCUIT BOARD (Handset) ()**

10.2. Bell Reception

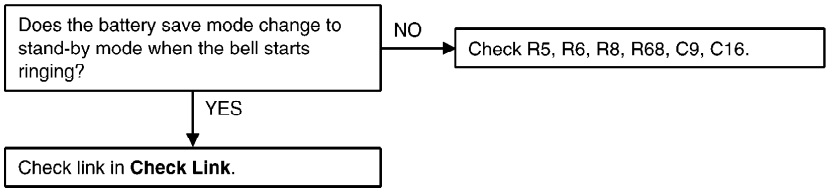
Base Unit


Is the bell signal found at IC3D (14) while the bell is ringing?
NO
Check **Telephone Line Interface.**
YES
Is the bell signal found at CPU (RingDET) while the bell is ringing?
NO
Check Q20, R146, R148, R149 and C97.
YES
Is there CPU (TX DATA)* (square wave form)?
NO
Check CPU and X2.
YES
Check link in **7.4. Check Link**.

Cross Reference:
Check Link ()
Telephone Line Interface ()

Note:
CPU: IC2

HANDSET

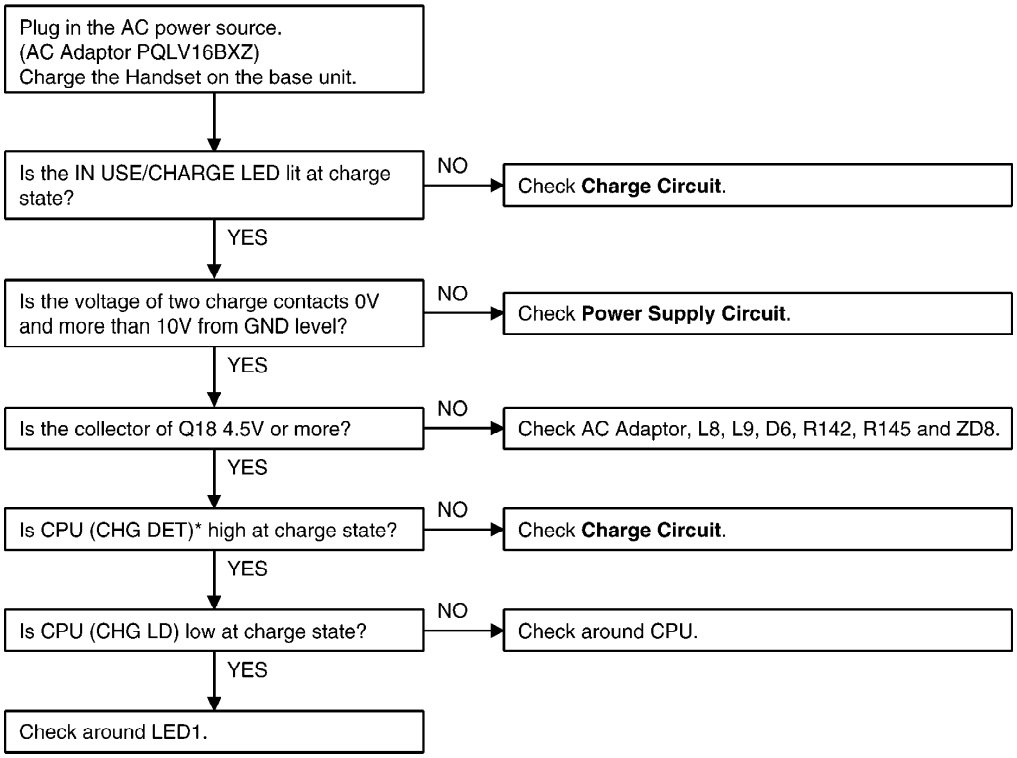

Does the battery save mode change to stand-by mode when the bell starts ringing?
NO
Check R5, R6, R8, R68, C9, C16.
YES
Check link in **Check Link**.

Cross Reference:
Check Link ()

***: Each measurement points are shown in CIRCUIT BOARD (Base Unit) () or CIRCUIT BOARD (Handset) ()**

10.3. Check Battery Charge

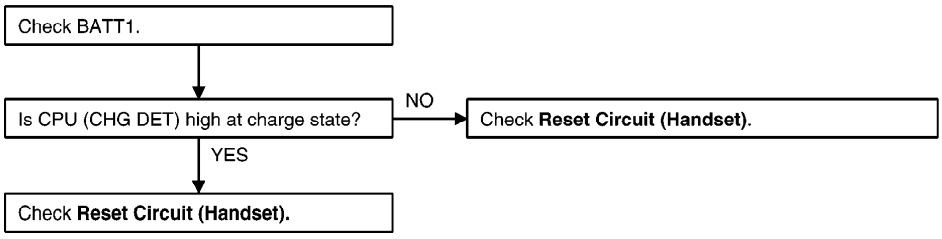
Base Unit


Plug in the AC power source.
(AC Adaptor PQLV16BXZ)
Charge the Handset on the base unit.
Is the IN USE/CHARGE LED lit at charge state?
NO
Check Charge Circuit.
YES
Is the voltage of two charge contacts 0V and more than 10V from GND level?
NO
Check Power Supply Circuit.
YES
Is the collector of Q18 4.5V or more?
NO
Check AC Adaptor, L8, L9, D6, R142, R145 and ZD8.
YES
Is CPU (CHG DET)* high at charge state?
NO
Check Charge Circuit.
YES
Is CPU (CHG LD) low at charge state?
NO
Check around CPU.
YES
Check around LED1.

Cross Reference:
Charge Circuit ()
Power Supply Circuit ()

Note:
CPU: IC2

HANDSET



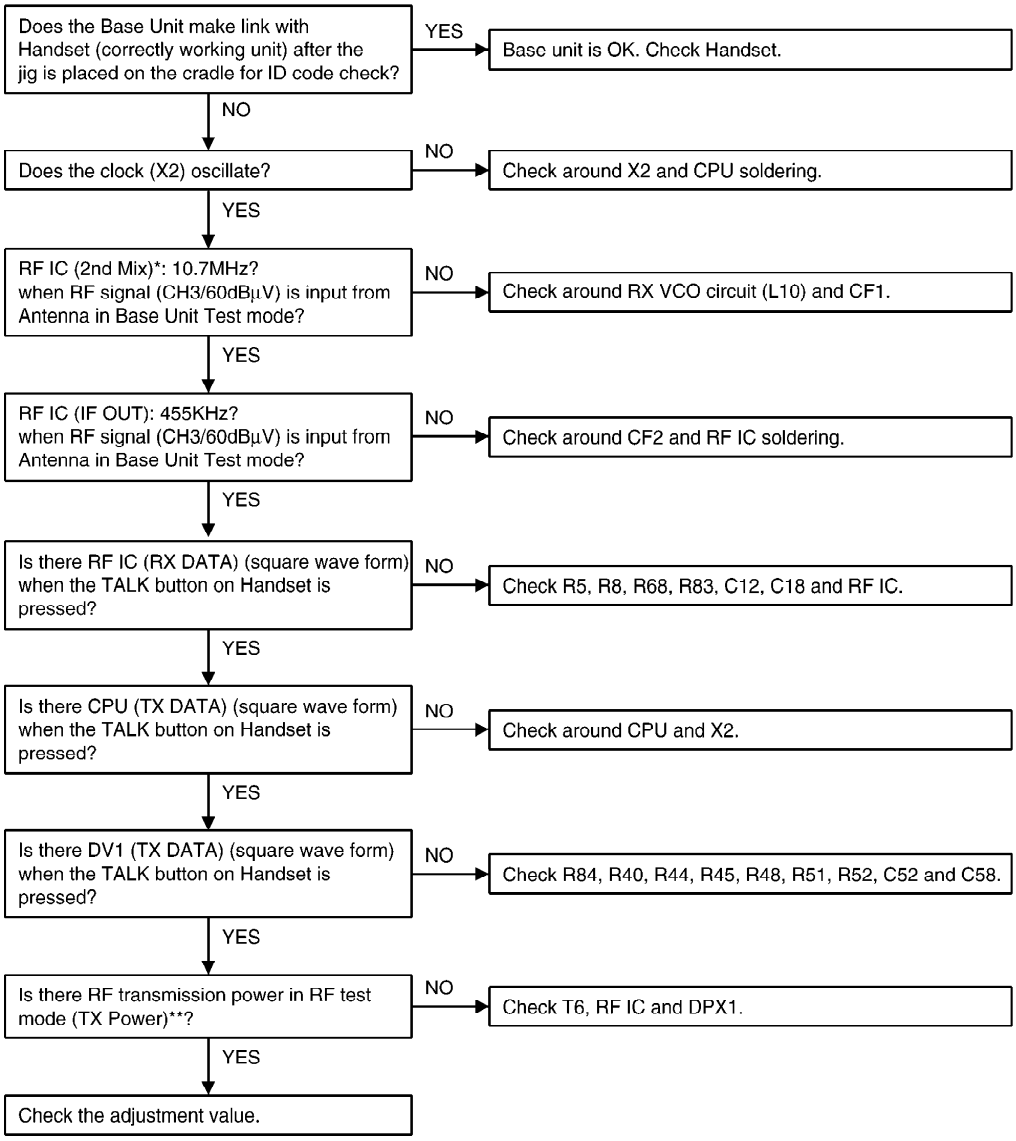
Cross Reference:
Reset Circuit (Handset) ()

Note:
CPU: IC2

***: Each measurement points are shown in CIRCUIT BOARD (Base Unit) () or CIRCUIT BOARD (Handset) ()**

10.4. Check Link

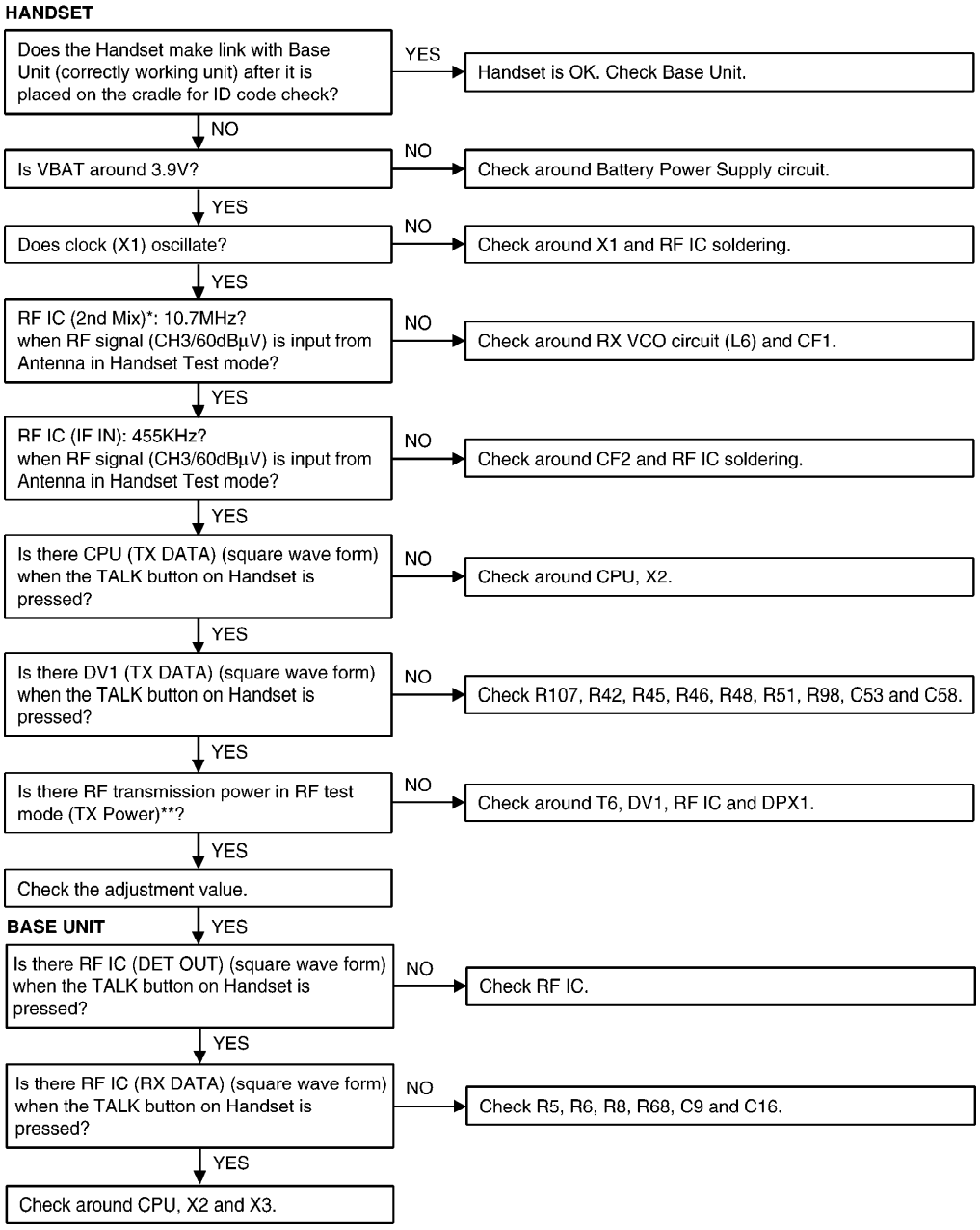
BASE UNIT


Does the Base Unit make link with Handset (correctly working unit) after the jig is placed on the cradle for ID code check?
YES
Base unit is OK. Check Handset.
NO
Does the clock (X2) oscillate?
NO
Check around X2 and CPU soldering.
YES
RF IC (2nd Mix)*: 10.7MHz? when RF signal (CH3/60dBμV) is input from Antenna in Base Unit Test mode?
NO
Check around RX VCO circuit (L10) and CF1.
YES
RF IC (IF OUT): 455KHz? when RF signal (CH3/60dBμV) is input from Antenna in Base Unit Test mode?
NO
Check around CF2 and RF IC soldering.
YES
Is there RF IC (RX DATA) (square wave form) when the TALK button on Handset is pressed?
NO
Check R5, R8, R68, R83, C12, C18 and RF IC.
YES
Is there CPU (TX DATA) (square wave form) when the TALK button on Handset is pressed?
NO
Check around CPU and X2.
YES
Is there DV1 (TX DATA) (square wave form) when the TALK button on Handset is pressed?
NO
Check R84, R40, R44, R45, R48, R51, R52, C52 and C58.
YES
Is there RF transmission power in RF test mode (TX Power)**?
NO
Check T6, RF IC and DPX1.
YES
Check the adjustment value.

****: Refer to Adjustment ()**

Note:
CPU: IC2
RF IC: IC1

***: Each measurement points are shown in CIRCUIT BOARD (Base Unit) () or CIRCUIT BOARD (Handset) ()**

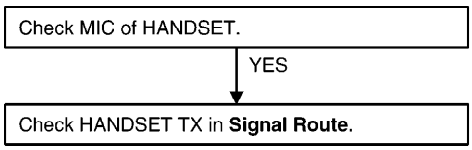

HANDSET
Does the Handset make link with Base Unit (correctly working unit) after it is placed on the cradle for ID code check?
YES
Handset is OK. Check Base Unit.
NO
Is VBAT around 3.9V?
NO
Check around Battery Power Supply circuit.
YES
Does clock (X1) oscillate?
NO
Check around X1 and RF IC soldering.
YES
RF IC (2nd Mix)*: 10.7MHz? when RF signal (CH3/60dBμV) is input from Antenna in Handset Test mode?
NO
Check around RX VCO circuit (L6) and CF1.
YES
RF IC (IF IN): 455KHz? when RF signal (CH3/60dBμV) is input from Antenna in Handset Test mode?
NO
Check around CF2 and RF IC soldering.
YES
Is there CPU (TX DATA) (square wave form) when the TALK button on Handset is pressed?
NO
Check around CPU, X2.
YES
Is there DV1 (TX DATA) (square wave form) when the TALK button on Handset is pressed?
NO
Check R107, R42, R45, R46, R48, R51, R98, C53 and C58.
YES
Is there RF transmission power in RF test mode (TX Power)**?
NO
Check around T6, DV1, RF IC and DPX1.
YES
Check the adjustment value.
BASE UNIT
YES
Is there RF IC (DET OUT) (square wave form) when the TALK button on Handset is pressed?
NO
Check RF IC.
YES
Is there RF IC (RX DATA) (square wave form) when the TALK button on Handset is pressed?
NO
Check R5, R6, R8, R68, C9 and C16.
YES
Check around CPU, X2 and X3.

****: Refer to Adjustment ().**

Note:
CPU: IC2
RF IC: IC1

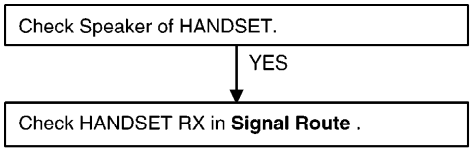
***: Each measurement points are shown in CIRCUIT BOARD (Base Unit) () or CIRCUIT BOARD (Handset) ()**

10.5. Check Handset Transmission



Cross Reference:
Signal Route ()

10.6. Check Handset Reception



Cross Reference:
Signal Route ()

***: Each measurement points are shown in CIRCUIT BOARD (Base Unit) () or CIRCUIT BOARD (Handset) ()**

11. ADJUSTMENTS (BASE UNIT)

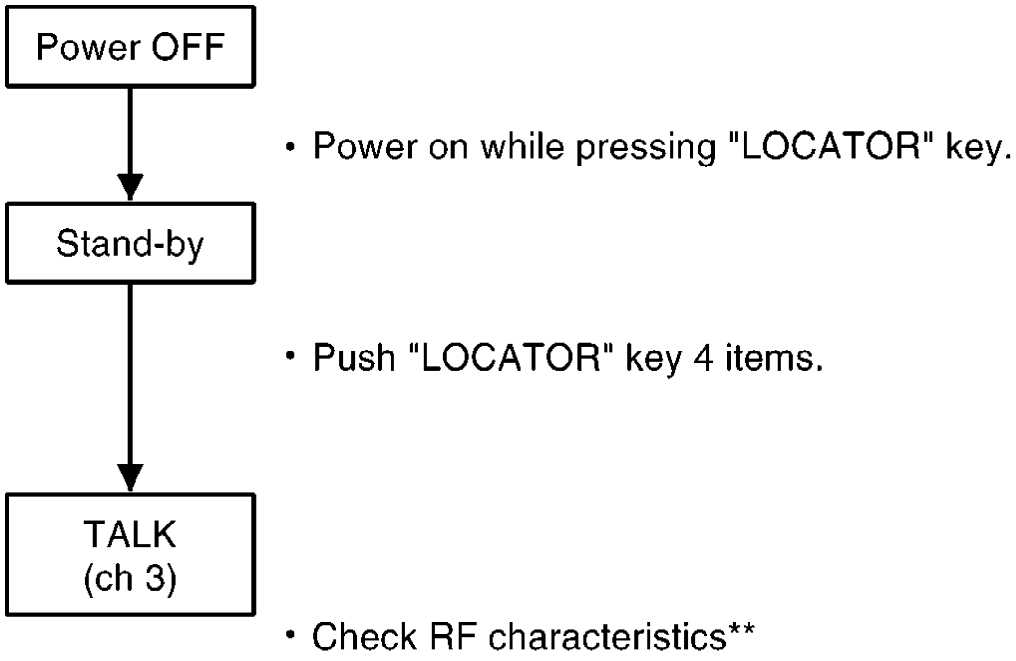
If your unit have below symptoms, adjust or confirm each item using remedy column from the table.

Symptom	Remedy*
The base unit dose not respond to a call from handset.	Make confirmation in item
The base unit dose not transmit or the transmit frequency is off.	Make adjustments in item
The transmit frequency is off.	Make adjustments in item
The transmit power output is low, and the operating distance between the base unit and the handset is less than normal.	Make adjustments in item
The reception sensitivity of base unit is low with noise.	Make confirmation in item
The transmit level is high or low.	Make confirmation in item
The reception level is high or low.	Make confirmation in item
The unit does not link.	Make confirmation in item

*: Refer to Adjustment ().

11.1. Test Mode Flow Chart (Base Unit)

The operation-flow of Test mode and main check items are shown below.

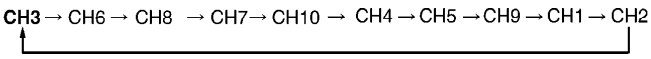


Note:

****: Refer to the above table.**

11.2. How to change the channel

When RING DET and GND is short, the channel will be changed as follows;



*: Refer to Flow Solder Side View ().

11.3. Adjustment

	Adjustment Items	Test Mode	Adjustment Point	*Procedure
(A)	RX VCO Confirmation	3ch Talk	-	-Confirm so that the reading of the Digital Voltmeter is 0.8V ~ 3.0V.
(B)	TX VCO Adjustment	3ch Talk	T6	-Adjust T6 so that the reading of the Digital Voltmeter is 2.0V ± 0.2V.
(C)	TX Frequency Adjustment	3ch Talk	VC1	-Adjustment VC1 so that the reading of the frequency counter is 46.670MHz ± 100Hz.
(D)	TX Power Adjustment	3ch Talk	T5	-Adjust T5 so that the reading of the RF VTVM is more than -2dBm.
(E)	RX Sensitivity Confirmation (2nd IF output)	3ch Talk	T2	1. Apply -60dBm output from S.S.G. (modulation frequency 1KHz, dev. 0KHz). 2. Confirm that the reading of RF VTVM is the maximum value (more than 20mV)
(F)	Line Output Level Confirmation	3ch Talk	-	1. Apply -60dBm output from S.S.G. (modulation frequency 1KHz, dev. 3KHz). 2. Confirm that the reading of AF VTVM is more than 200mV (600 Ω load).
(G)	Line Input Modulation Confirmation	3ch Talk	-	1. Input via loop simulator 1.0KHz, 55mV (measured at T-R) signal. 2. Apply -60dBm output from S.S.G. (modulation frequency 1KHz, dev. 0KHz). 3. Confirm so that the reading of FM Deviation Meter is 2.0KHz ± 0.5KHz.
(H)	Noise Squelch Confirmation	3ch Talk	-	1. Measure the SSG output level when the noise squelch changes from Low to High. 2. Confirm that the SSG output level is -105dBm ~ -110dBm.

*** : The connection of adjustment equipment are as shown in Adjustment Standard (Base Unit) ().**
SSG Frequency: 49.86 MHz

11.4. Adjustment Standard (Base Unit)

When connecting the Simulator and Equipments for checking, please refer to the illustration below.

Note: (A) - (H) is refered to ADJUSTMENTS (BASE UNIT) ()

12. ADJUSTMENTS (HANDSET)

If your unit have below symptoms, adjust or confirm each item using remedy column from the table.

Symptom	Remedy*
The movement of Battery Low Indicator is wrong.	Make confirmation in item
The base unit does not respond to a call from the handset.	Make adjustments in item
The base unit does not transmit or the transmit frequency is off.	Make confirmation in item
The transmit frequency is off.	Make adjustments in item
The transmit power output is low, and the operating distance between the base unit and the Handset is less than normal.	Make confirmation in item
The reception sensitivity of the handset is low with noise.	Make confirmation item (F
Does not link between the base unit and the handset.	Make confirmation in item
The reception level is high or low.	Make confirmation item (H
The transmit level is high or low.	Make confirmation in item

***: Refer to Adjustment ().**

Unit condition:

1. Remove the antenna lead wire from P.C Board of the handset.

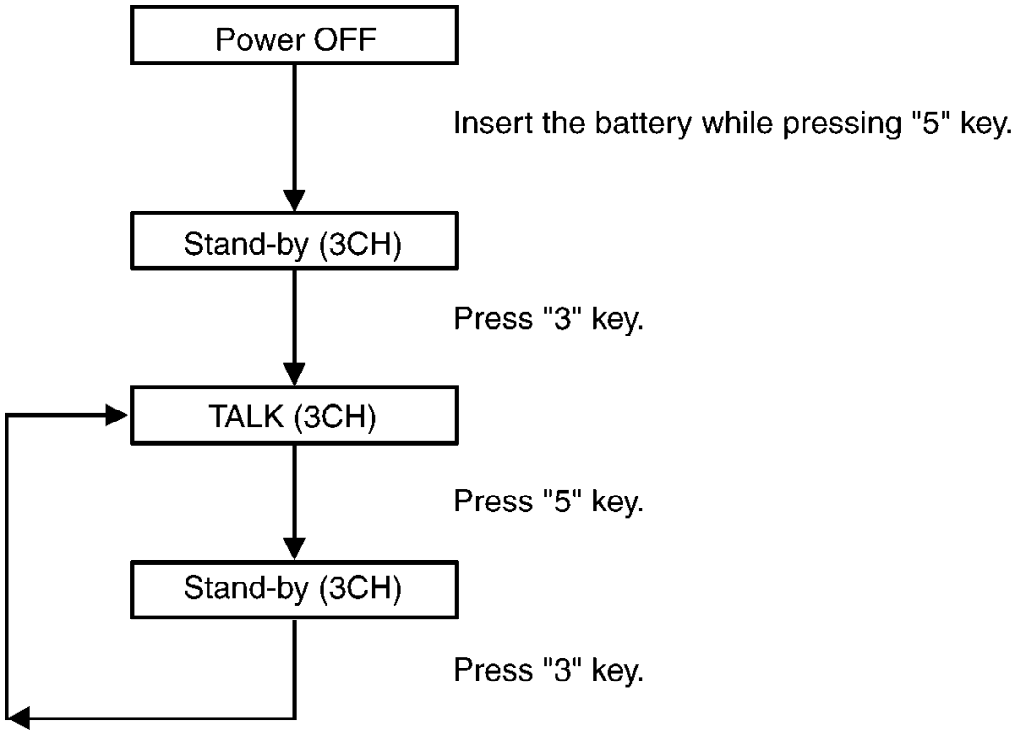
2. Power Supply: DC 3.9V (DC power supply)

3. Volume: HIGH (When P.C. Board of handset is in test mode, volume condition is medium. Press “LOCATOR” key once.)

4. Speaker Load: 150 Ω

CH	TX Frequency	RX Frequency
CH3	49.860MHz	46.670MHz

12.1. Test Mode Flow Chart (Handset)

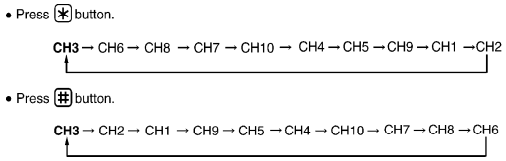


Note:

Refet to CIRCUIT BOARD (Handset) ()

Signal Route ()

12.2. How to change the channel



12.3. Adjustment

	Adjustment Items	Test Mode	Adjustment Point	Procedure
(A)	Battery Low Confirmation	3ch Talk	-	1. Apply 3.50V between BATT(+) and BATT(-). 2. Confirm that there is no flashing of RECHARGE LED. 3. Apply 3.40V between BATT(+) and BATT(-). 4. Confirm that there is flashing of RECHARGE LED.
(B)	TX VCO Adjustment	3ch Talk	T6	1. Adjust T6 so that the reading of the Digital Voltmeter is 1.5V ± 0.2V.
(C)	RX VCO Confirmation	3ch Talk	-	1. Set S2 to RX VCO side. 2. The reading of the Digital Voltmeter is 0.8V ~ 3.0V. (After adjusting, set S2 to OFF).
(D)	TX Frequency Adjustment	3ch Talk	VC1	-Confirm so that the reading of the frequency counter is 49.860MHz ± 100Hz.
(E)	TX Power Confirmation	3ch Talk	-	-Confirm output level should be over -2dBm on RF VTVM (50 Ω load).
(F)	RX Sensitivity Confirmation (2nd IF output)	3ch Talk	T3	1. Apply -60dBm output from S.S.G. (modulation frequency 1KHz, dev. 0KHz). 2. Confirm 2nd IF output so that the reading of RF VTVM is more than 15mV.
(G)	Noise Squelch Confirmation	3ch Talk	-	1. Measure the SSG output level when the noise squelch changes from Low to High. (modulation frequency 1KHz, dev.3kHz) 2. Confirm that the SSG output level is -105dBm.
(H)	Speaker Output Level Confirmation	3ch Talk	-	1. Apply -60dBm output from S.S.G. (modulation frequency 1KHz, dev. 3KHz). 2. Confirm that SP output level is more than 60mV. (distortion: less than 5%) (volume High).
(I)	Mic Modulation Factor Confirmation	3ch Talk	-	1. Apply a MIC signal (1KHz, 2.4mV at 600 Ω load). 2. Confirmation so that the reading FM Deviation Meter is 2.0KHz ± 0.5KHz.
(J)	Data Modulation Confirmation	3ch Talk	-	-Confirm for 4.0KHz ~ 6.0KHz FM Deviation Meter reading.

The connections of adjustment equipment are as shown in Adjustment Standard (Handset) ().
SSG Frequency: 46.670 MHz

12.4. Adjustment Standard (Handset)

When connecting the Simulator and Equipments for checking, please refer to the illustration below.

(Component View)

Note: (A) - (I) is refered to ADJUSTMENTS (HANDSET) ()

(Flow Solder Side View)

Note: (A) - (I) is refered to ADJUSTMENTS (HANDSET) ()

13. RF SPECIFICATION

13.1. Base Unit

Item	Value	Refer to -.*	Remark
TX Frequency	46.670 MHz ± 100Hz	ADJUSTMENTS (BASE UNIT) (C)	at CH3
TX Power	more than -2dBm	ADJUSTMENTS (BASE UNIT) (D)	at CH3
Line Modulation factor	1.5 kHz~2.5 kHz	ADJUSTMENTS (BASE UNIT) (G)	
Data Modulation factor	4.0 kHz~6.0 kHz	—	
Line Output level	more than 200mV	—	

*: Refer to Adjustment ().

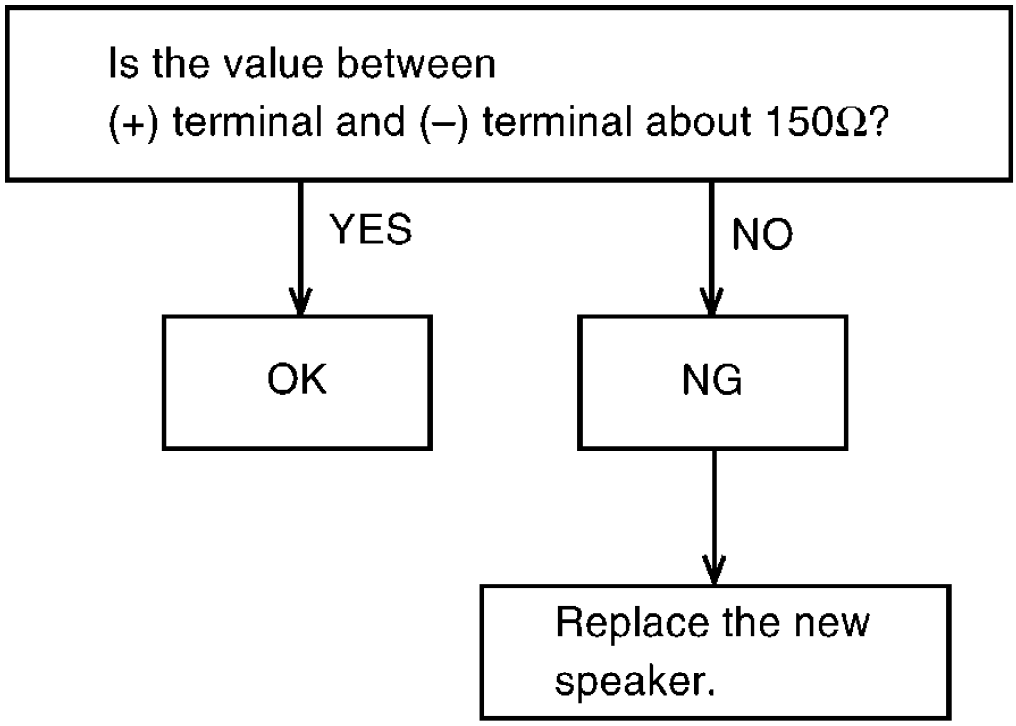
13.2. Handset

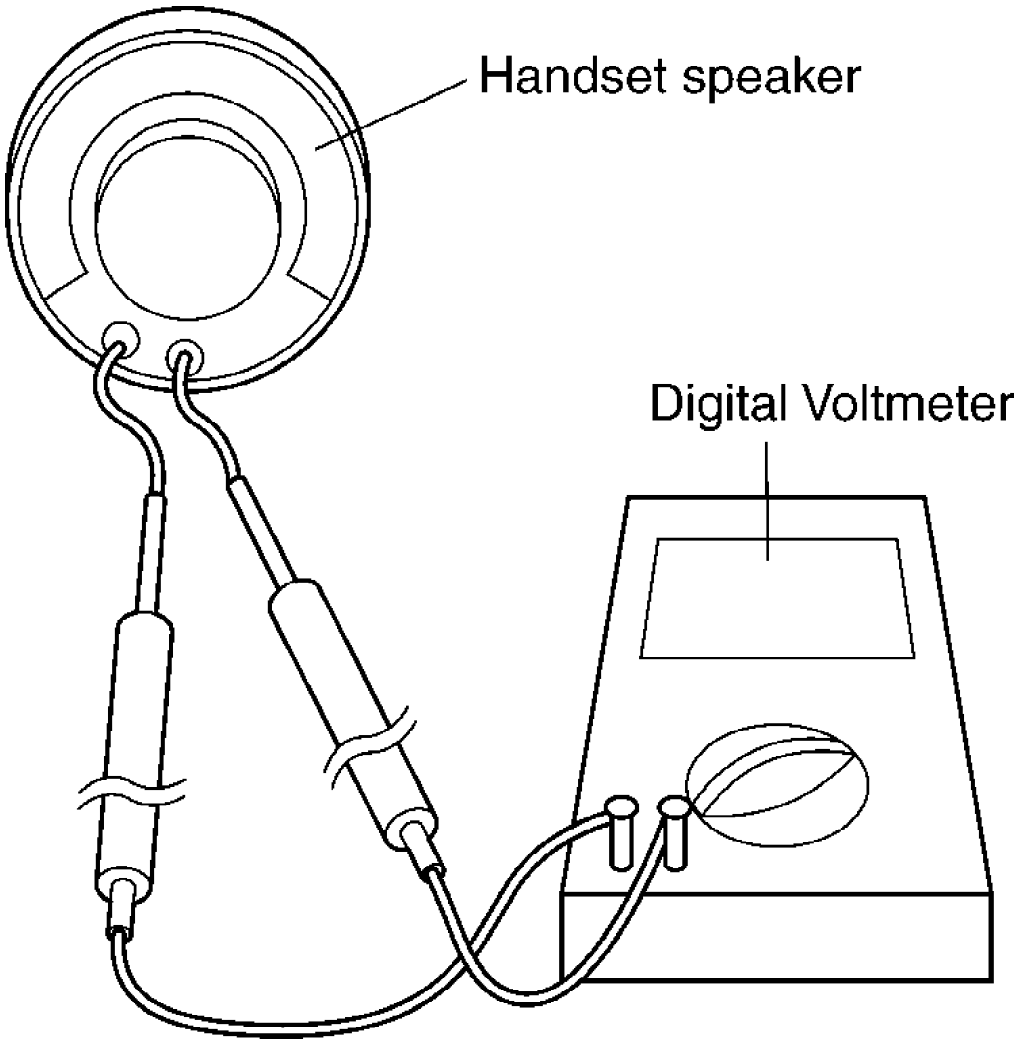
Item	Value	Refer to -.**	Remark
TX Frequency	49.860 MHz ± 100Hz	ADJUSTMENTS (HANDSET) (D)	at CH3
TX Power	more than -2dBm	ADJUSTMENTS (HANDSET) (E)	at CH3 (Ante soldering pc 50 Ω Load)
Data Modulation factor	4.0 kHz~6.0 kHz	ADJUSTMENTS (HANDSET) (J)	at CH3
MIC Modulation factor	1.5 kHz/dev~2.5 kHz/ dev	ADJUSTMENTS (HANDSET) (I)	at CH3 (MIC terminal 2.4mV Input)
SP Output level	more than 60mV	—	

**: Refer to Adjustment ().

14. HOW TO CHECK THE HANDSET SPEAKER

1. Prepare the digital voltmeter, and set the selector knob to ohm meter.
2. Put the probes at the speaker terminals as shown below.


Is the value between
(+) terminal and (–) terminal about 150Ω?
YES
NO
OK
NG
Replace the new speaker.

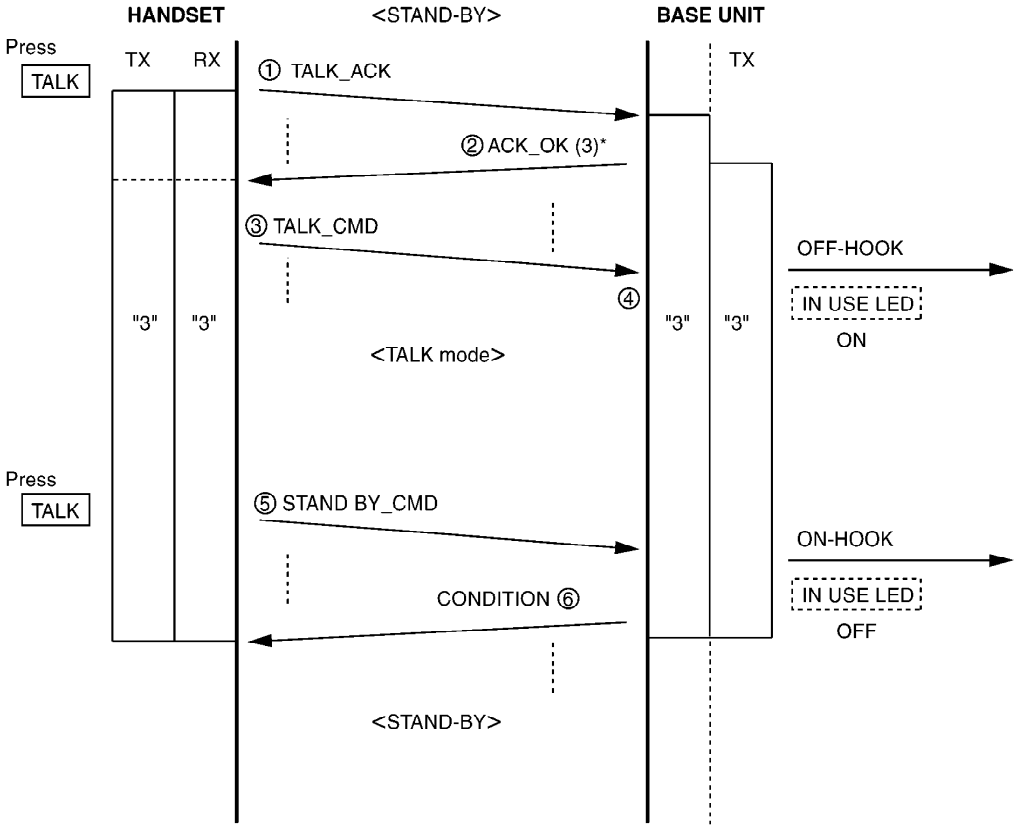

Handset speaker
Digital Voltmeter

15. FREQUENCY TABLE (MHz)

	BASE UNIT		PORTABLE UNIT	
Channel	Transmit Frequency	Receive Frequency	Transmit Frequency	Receive Fre
1	46.610	49.670	49.670	46.61(
2	46.630	49.845	49.845	46.63(
3	46.670	49.860	49.860	46.67(
4	46.710	49.770	49.770	46.71(
5	46.730	49.875	49.875	46.73(
6	46.770	49.830	49.830	46.77(
7	46.830	49.890	49.890	46.83(
8	46.870	49.930	49.930	46.87(
9	46.930	49.990	49.990	46.93(
10	46.970	49.970	49.970	46.97(

16. EXPLANATION OF CPU DATA COMMUNICATION

16.1. STAND-BY -> TALK, TALK -> STAND-BY



Press the TALK button

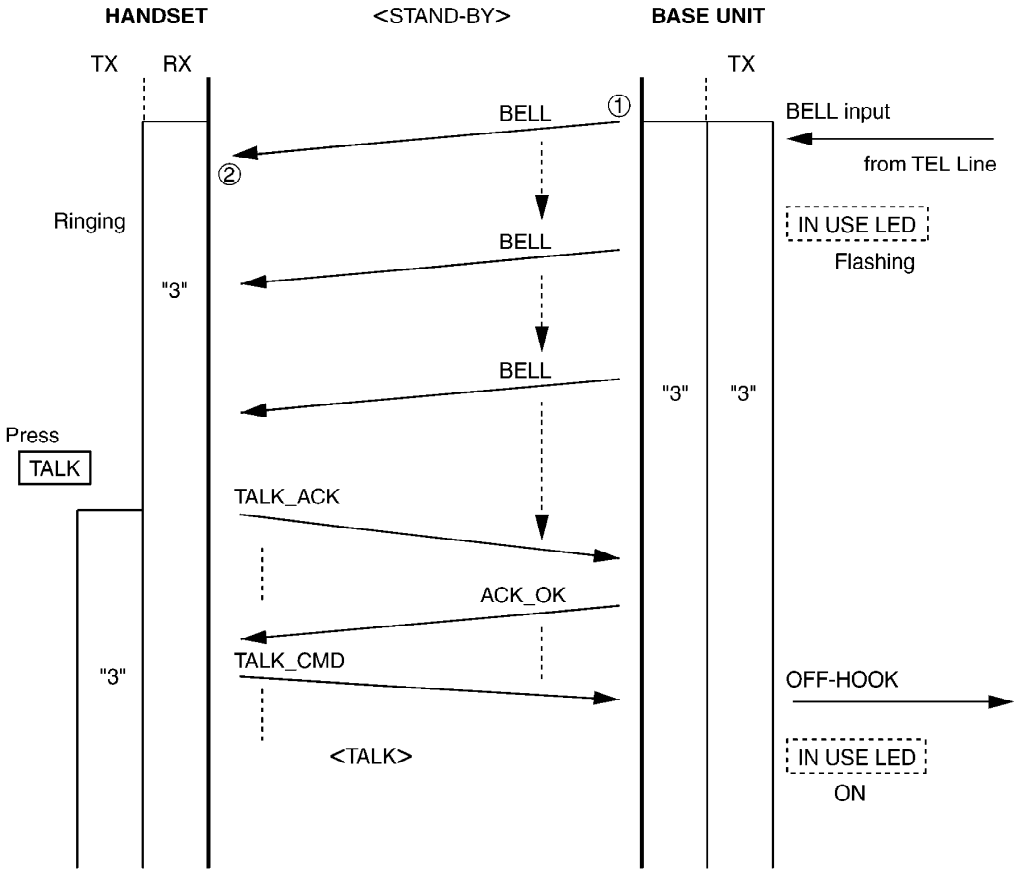
① The handset transmits TALK_ACK.
② Then base unit transmits ACK_OK including the channel number (Example: "3").
③ The handset transmits TALK_CMD.
④ The base unit goes to off-Hook mode.

Press the TALK button

⑤ The handset transmits STANDBY_CMD at the channel.
⑥ The base unit transmits CONDITION at the TALK channel.

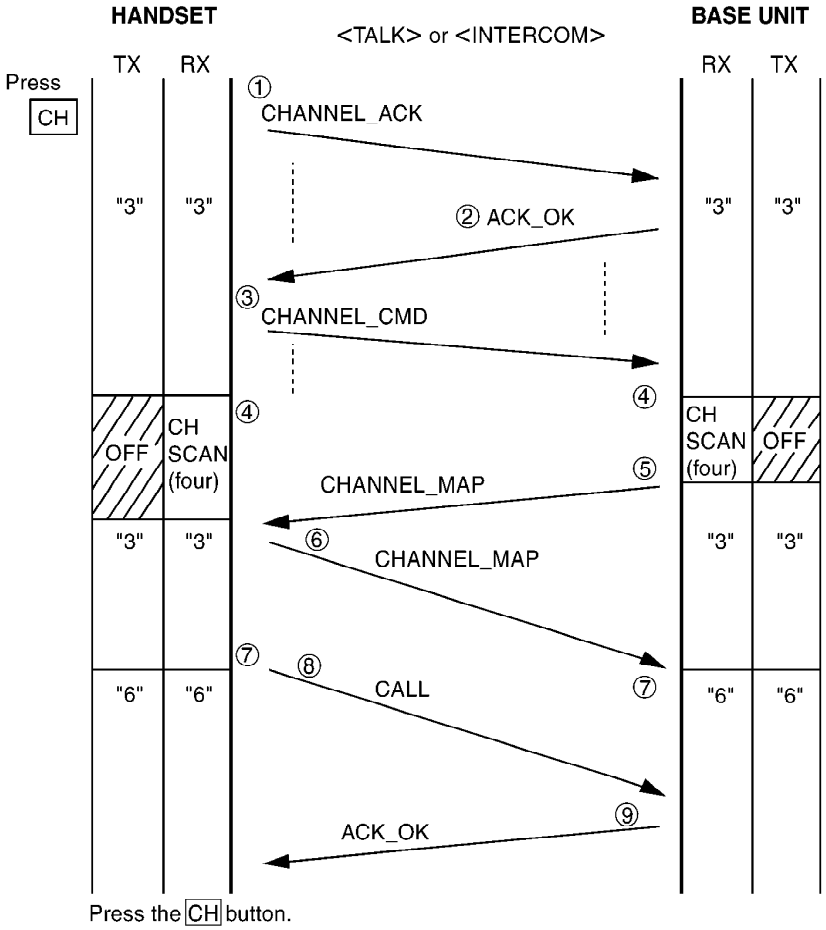
***: The channel is changed if the noise interferes with the conversation.**

16.2. Ringing



① When the bell signal is input, the base unit transmits BELL.
② The handset rings the bell on receiving BELL.

16.3. Changing the Channel



① The handset transmits CHANNEL_ACK.
② The base unit replies with ACK_OK.
③ Then handset transmits CHANNEL_CMD.
④ The handset and base unit turn off tx power and scan the channel map for next four channel.
⑤ The handset transmits CHANNEL_MAP.
⑥ The base unit transmits CHANNEL_MAP.
⑦ The handset and base unit moves to the "vacant channel". (Example: "6").
⑧ The base unit transmits CALL.
⑨ The handset transmits ACK_OK.

16.4. Ports for transmitting and receiving of data

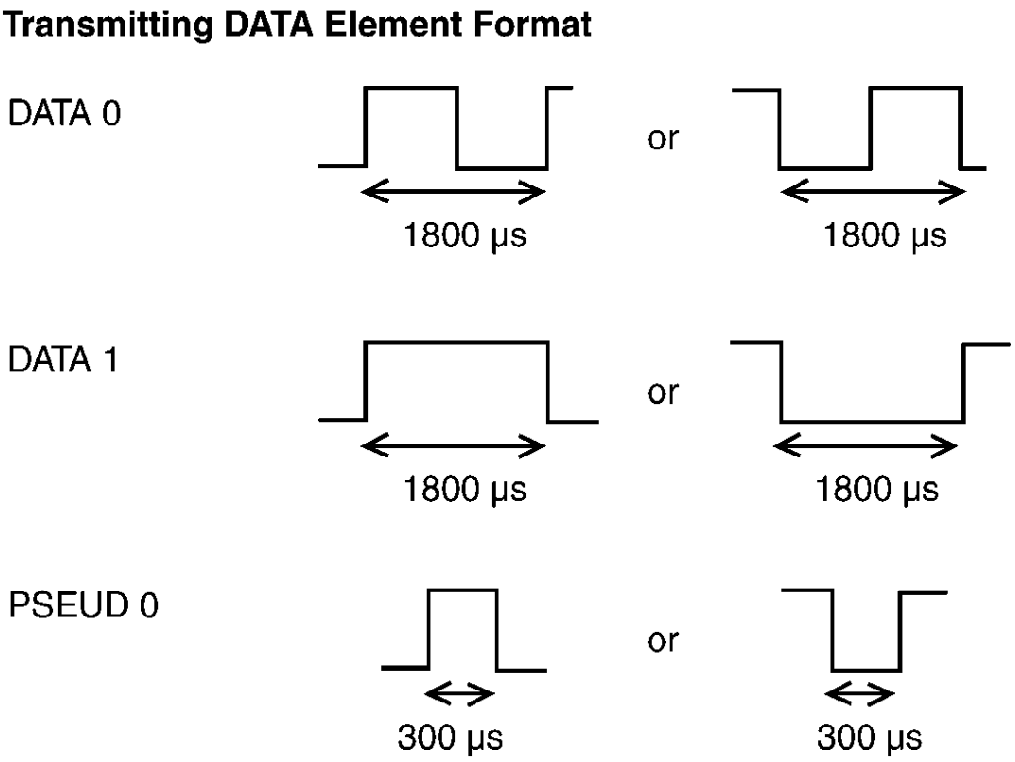
Handset:
transmitting (TX) ... 36 Pin
receiving (RX) ... 4 Pin

Base Unit:
transmitting (TX) ... 17 Pin
receiving (RX) ... 10 Pin

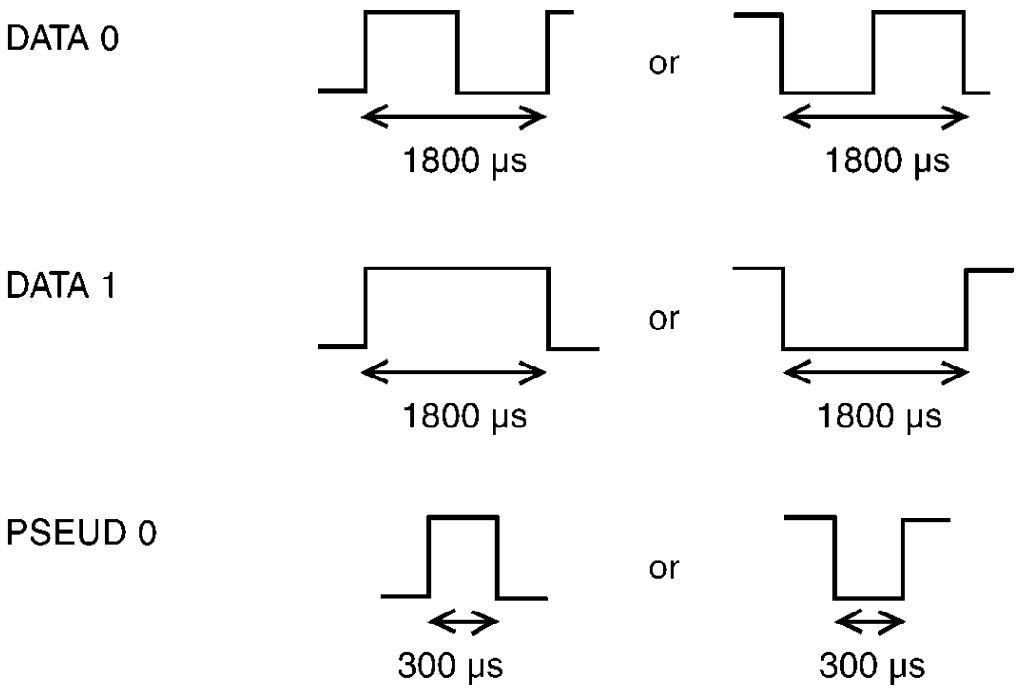
16.5. Waveform of DATA used for cordless transmission and reception

The DATA which is transmitted from the Handset to the Base Unit is combination of DATA 0, DATA 1, PSEUD.
The DATA which is transmitted from the Base Unit to the Handset is combination of DATA 0, DATA 1, PSEUD.

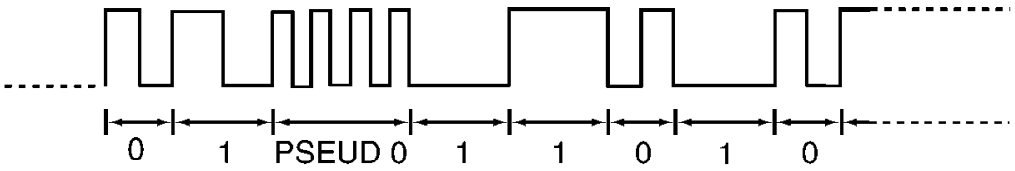
16.5.1. Handset



16.5.2. Base Unit



- For example (one of part of data)



17. BLOCK DIAGRAM (BASE UNIT)

18. BLOCK DIAGRAM (HANDSET)

19. CIRCUIT OPERATION

19.1. Outline

Base unit consists of the following ICs as shown in BLOCK DIAGRAM.

- CPU:IC2
- Controlling the whole system
- Forming/analyzing all data signals (ACK, CMD signal etc.*)
- All interfaces (ex: LED, KEY, SP, Mic, LCD, Detector Circuit (Charge / Power Down)
***Refer to EXPLANATION OF CPU DATA COMMUNICATION ().**
- RF IC:IC1
- PLL Oscillator
- Detection
- Compress/ Expander

- first/ second mixer
- Amplifier for transmission and reception
- Additionally,
- Power Supply Circuit
- Reset Circuit
- Charge Circuit
- Telephone Line Interface Circuit

Handset consist of the following ICs as shown in BLOCK DIAGRAM.

- CPU: IC2
- All data signals (forming/analyzing ACK or CMD signal*)
- All interfaces (ex; LED, Key, Buzzer, Detector Circuit, Charge, Battery Low)
- RAM for keeping the data (CH Number, ID Code, etc.)
- RF IC:IC1
- PLL Oscillator
- Detector
- Compress/Expander
- first, second mixer
- Amplifier for transmission and reception

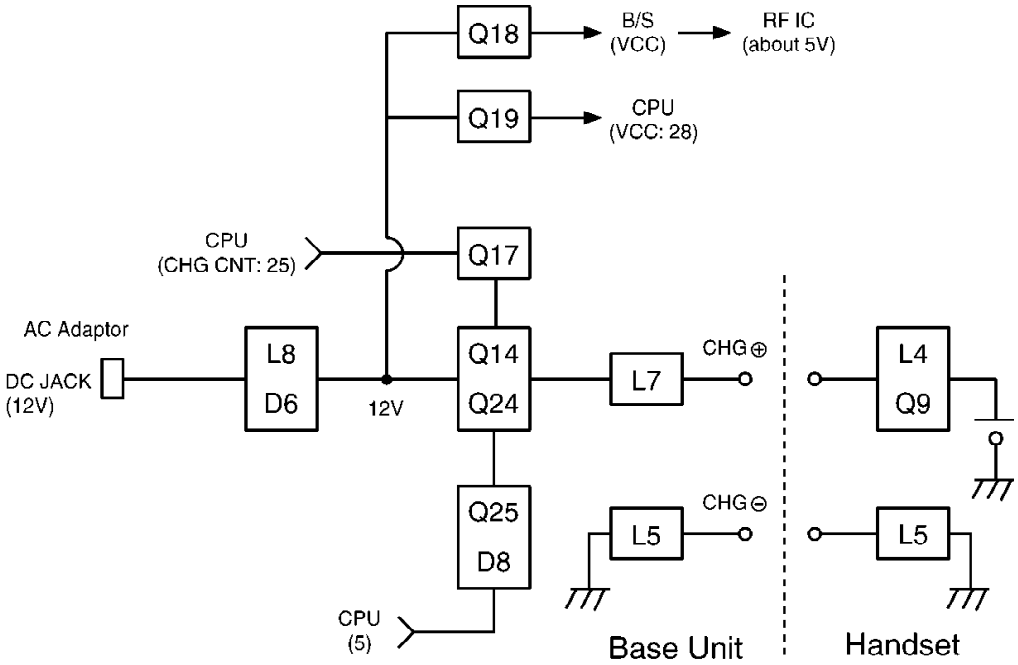
*Refer to EXPLANATION OF CPU DATA COMMUNICATION ().

19.2. Power Supply Circuit

The power supply to the CPU (Digital, Analog) and RF IC from AC Adaptor (+12V) is shown in the diagram below.

The base unit power supply is DC12V. The handset's power is supplied from 3.6V battery (Nickel-Cadmium battery) which is
installed in the handset.
Power supply for transmitter is turned on by a press of "Talk" key on the handset. During the stand-by mode, the unit stops
transmitting but receives the signal.
Also during on-hook condition (the handset is placed on the base unit), backup power for memory of the last dialed number is
supplied through the battery. The memory of this unit is not backed up by the current from the telephone line.
The base unit DC power supply is regulated by Q18, the CPU power is regulated by Q19. The Q401, Q403 detects AC Adaptor power failure and maintains the unit security code.

Fig. 1



19.3. Reset Circuit (Base Unit)

After power supply from AC adaptor, the below circuit is for making reset signal. Refer to the below waveform.

Fig. 2

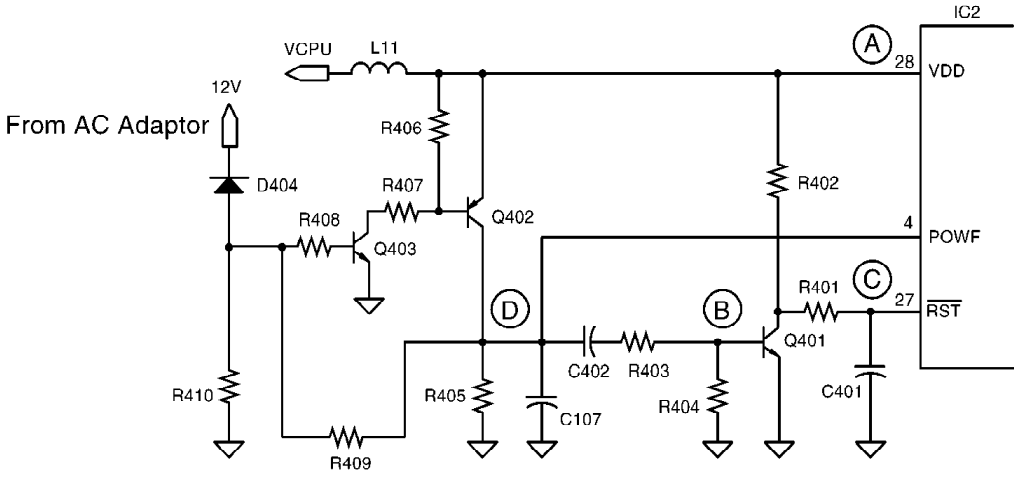
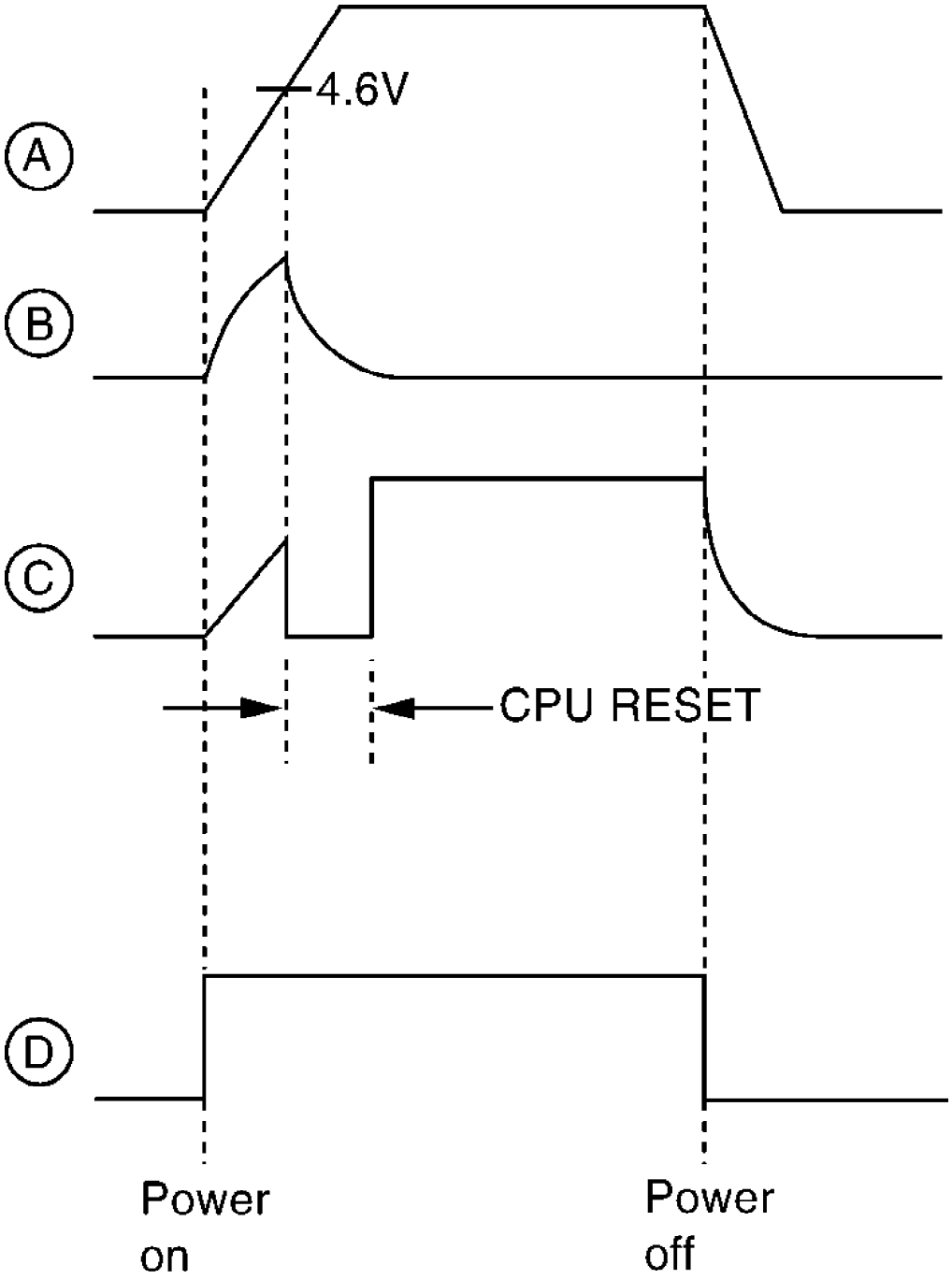


Fig. 3



19.4. Charge Circuit

Circuit Operation:
When charging the handset on the base unit, the charge current is as follows;
DC (JK2) → L8 → D6 → Q14 → Q24 → L7 → CHG+(Base) → [CHG+(Handset) → L4 → Q9 → BATT(1)....Battery....BATT(2) → L5 → CHG-(Handset)] → CHG-(Base) → L5,
In this way, the CPU on both unit detects the fact that the battery is charged.
The charge current is controlled by switching Q24, Q25 of Base Unit. The battery is charged in normal mode for 15 hours and then in trickle mode.

19.5. Telephone Line Interface

Function:

- Bell signal detection
- ON/OFF hook and pulse dial circuit
- Side tone circuit

Bell signal detection and OFF HOOK circuit:
In the idle mode, Q103 is open to cut the DC loop current and decrease the ring load. When ring voltage appears at the Tip (T)
and Ring (R) leads (When the telephone rings), the AC ring voltage is transferred as follows:
JK1 (3): T → L6 → R184 → R144 → IC3D (12,13 → 14) → C97 → R148 → Q20 → IC2 (24) [BELL]
JK1 (2): R → L4 → R183 → R152 → ↑
When the CPU (DSP) detects a ring signal and press the TALK Key on the handset. Q6 turns on and then RY1 turns on,
thus providing an off-hook condition (active DC current flow through the circuit) and the following signal flow is for the loop
current.
T → R160 → L4 → D2 → RY1 → R107 → T7 → R116 → D5 → L6 → R161 → R [OFF HOOK]

ON HOOK Circuit:
Q6 is open, RY1 disconnected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an on-hook
condition.

Pulse Dial Circuit:
CPU (Hook) turns RY1 ON/OFF to make the pulse dialing via Q6.

Make/Break ratio when dialing with the Handset: 40%:60%

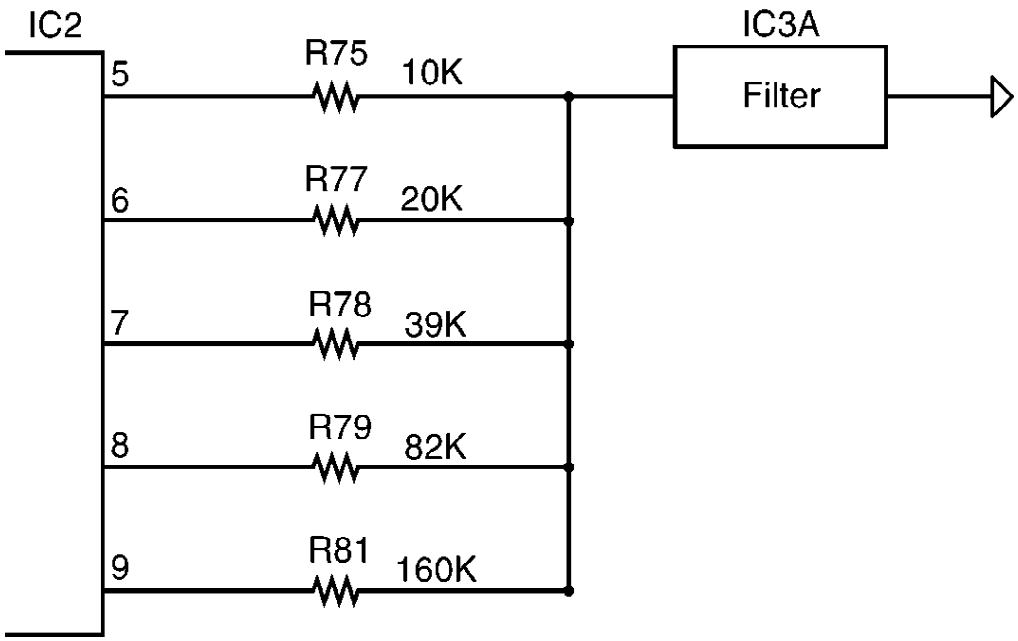
Side Tone Circuit:
Basically this circuit prevents the TX signal from feeding back to RX signal.
As for this unit, TX signal feed back from Q11 is canceled by the cancellor circuit of AGC.

19.6. DTMF

The DTMF signal is generated by five outputs of IC2 (CPU) and output to telephone line through the filter of IC3A which is a lowpass filter as shown below.

The combination of five outputs “1”, “0” makes 32 (=2^5) level signals and makes smooth

waveform after filter like a DTMF generator.



19.7. Transmitter/Receiver

Base Unit and Handset are mainly consists of RF(Radio Frequency) IC and CPU.
Base Unit and Handset transmit/receive voice signal and data signal through the antenna on carrier frequency.

Signal Pass :
***Refer to CDL TX/RX in Signal Route ().**

19.7.1. Base to Handset

Circuit Operation:

The voice signal input from the TEL LINE interface goes to RF IC as shown in BLOCK DIAGRAM (BASE UNIT) ().
In the talk mode (off-hook) condition, the telephone line voice signal passes through D2, D3, D4, D5, RY1 (Relay), R107 and T7.
The other party's voice signal is coupled with T7 and amplified by Q11 and led to IC3-B (OP Amplifier device).
And the signal goes through the compressor of RF IC, it is output to transmitter circuit.
The signal of the data sent to the handset is applied in the anode of the variable capacitor diode (VARICAP : DV1).
The capacitor of VARICAP is changing in accordance with the voice signal from telephone line interface or TX DATA signal from
CPU. Therefore, the carrier frequency which is generated by TXVCO will be changing, and

Frequency modulated RF
signal is generated and amplified by RF AMP(Q3, Q4, T5). It pass through the Duplexer DPX1 and radiated from Antenna.

The signal is transmitted from the base unit and received by the handset antenna and amplified by RF amplifier (Q1) through
DPX1 as shown in BLOCK DIAGRAM (HANDSET) (). And then it is converted to 10.7 MHz and 455 KHz Intermediate frequency by RF IC and related components.
The demodulated audio signal is output from RF IC (DET OUT) and passed through "Expander" process to reduce noise, then
voice signal amplified by "Receiver amplifier" is output to receiver (REC1).
The receiver loudness is adjustable using "LOUD" key on the handset. Q2 and Q3 control the volume. When CPU (VOL1)
becomes low, the volume becomes "MID", while CPU (VOL1, 2) become low, the volume becomes "HIGH".

TX data (to Handset)
CPU (VTX) becomes low to turn on the transmission power transistor Q2, and CPU (TX-data) sends data signal. It is
FM-modulated by TXVCO and driven by RF AMP, then transmitted to the handset.

19.7.2. Handset to Base

Circuit Operation:
The voice signal from the handset user is picked up by the microphone (MC1), voice signal passes through "Compressor"
process to reduce noise as shown in BLOCK DIAGRAM (HANDSET) (). And the voice is FM-modulated by
VARICAP (DV1).
The carrier frequency is generated by TX VCO. The transmitter power transistor Q4 is turned on/off by CPU (VTX).
The carrier signal is amplified by RF AMP and sent to the handset duplexer and antenna.
The signal of 49MHz band (49.670~49.99MHz) which is input from ANT is filtered at DPX1 as shown in
BLOCK DIAGRAM (BASE UNIT) (), then it is input to RF IC.
The signal input to RF IC is converted through Mixer inside of RF IC, RF filter (CF1, CF2) and Expander.
The signal is transmitted from the handset and received by the base unit antenna and amplified by RF amplifier Q1, then
it is converted to10.7 MHz and 455 KHz Intermediate by RF IC. The demodulated audio signal is output from RF IC
(DET OUT) and passed through "Expander" process to reduce noise, then voice signal is led to LINE AMP. The signal is
passed through TELEPHONE INTERFACE and Tel-line.

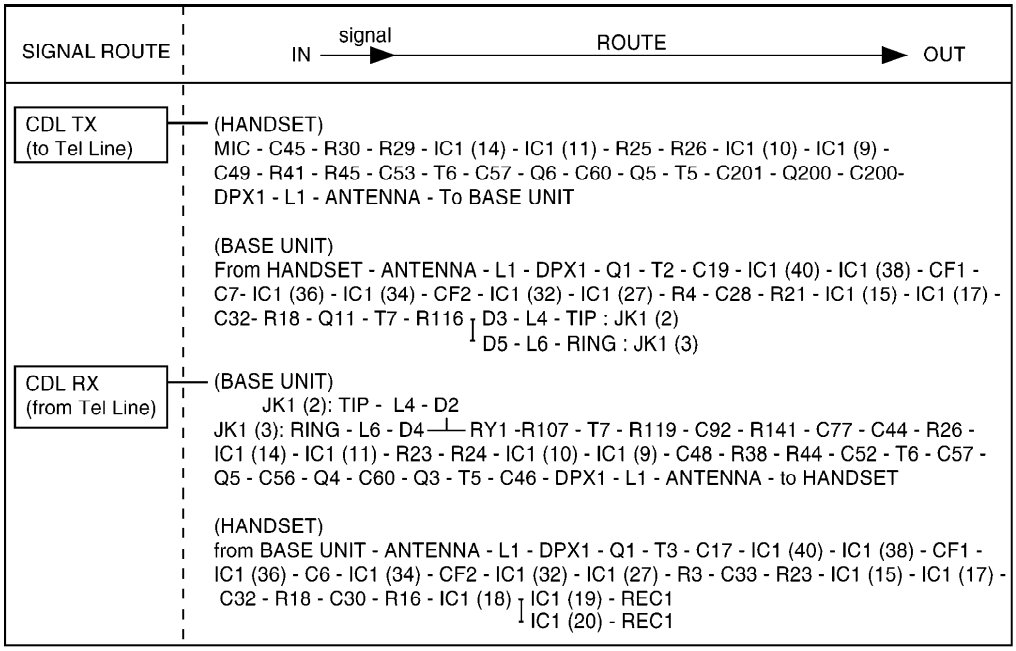
RX data (from Handset):
The data signal from handset (ex: Talk, ACK, COM) is also included in 49 MHz band same as the voice data. After second if
filter, the data signal is made square shape by data limiting AMP of the RF IC. RX data is output to CPU (RX Data).

19.7.3. RF signal operation/control and PLL operation (RF UNIT)

Base unit radio frequency signal received by antenna passes through duplexer (DPX1).
RF signal is amplified by RF AMP. RF signal received from RF IC is mixed with RX local frequency at Mixer to generate
10.7 MHz wide band IF. The reference frequency is generated by X1 10.245 MHz crystal. VC1 is the reference frequency
for adjustment. The 10.7 MHz is mixed with reference and 455KHz narrow band IF is generated. The demodulation audio signal
is adjusted to the maximum at T1. RF IC is controlled by CPU (RF_STB, DATA, CLK). The RX local frequency is generated
by RXVCO.

19.8. Signal Route

Each signal route is as follows.


SIGNAL ROUTE
IN
signal
ROUTE
OUT
CDL TX
(to Tel Line)
(HANDSET)
MIC - C45 - R30 - R29 - IC1 (14) - IC1 (11) - R25 - R26 - IC1 (10) - IC1 (9) -
C49 - R41 - R45 - C53 - T6 - C57 - Q6 - C60 - Q5 - T5 - C201 - Q200 - C200-
DPX1 - L1 - ANTENNA - To BASE UNIT
(BASE UNIT)
From HANDSET - ANTENNA - L1 - DPX1 - Q1 - T2 - C19 - IC1 (40) - IC1 (38) - CF1 -
C7- IC1 (36) - IC1 (34) - CF2 - IC1 (32) - IC1 (27) - R4 - C28 - R21 - IC1 (15) - IC1 (17) -
C32- R18 - Q11 - T7 - R116
D3 - L4 - TIP : JK1 (2)
D5 - L6 - RING : JK1 (3)
CDL RX
(from Tel Line)
(BASE UNIT)
JK1 (2): TIP - L4 - D2
JK1 (3): RING - L6 - D4
RY1 -R107 - T7 - R119 - C92 - R141 - C77 - C44 - R26 -
IC1 (14) - IC1 (11) - R23 - R24 - IC1 (10) - IC1 (9) - C48 - R38 - R44 - C52 - T6 - C57 -
Q5 - C56 - Q4 - C60 - Q3 - T5 - C46 - DPX1 - L1 - ANTENNA - to HANDSET
(HANDSET)
from BASE UNIT - ANTENNA - L1 - DPX1 - Q1 - T3 - C17 - IC1 (40) - IC1 (38) - CF1 -
IC1 (36) - C6 - IC1 (34) - CF2 - IC1 (32) - IC1 (27) - R3 - C33 - R23 - IC1 (15) - IC1 (17) -
C32 - R18 - C30 - R16 - IC1 (18)
IC1 (19) - REC1
IC1 (20) - REC1

20. CIRCUIT OPERATION (HANDSET)

20.1. Reset Circuit (Handset)

The power of handset is supplied by battery.
Whenever the battery is recharged or inserted, the impulse at CHG+ becomes Reset signal through Q11, and sent to CPU.

Fig. 4

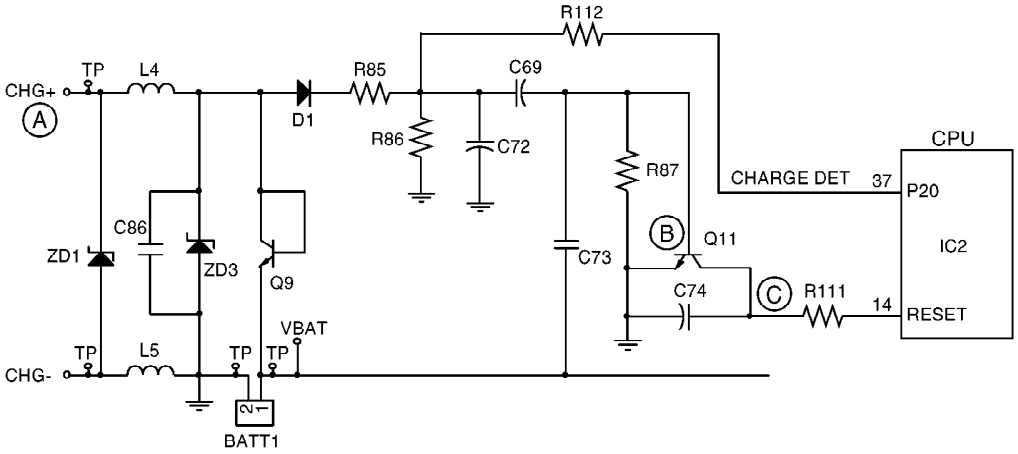
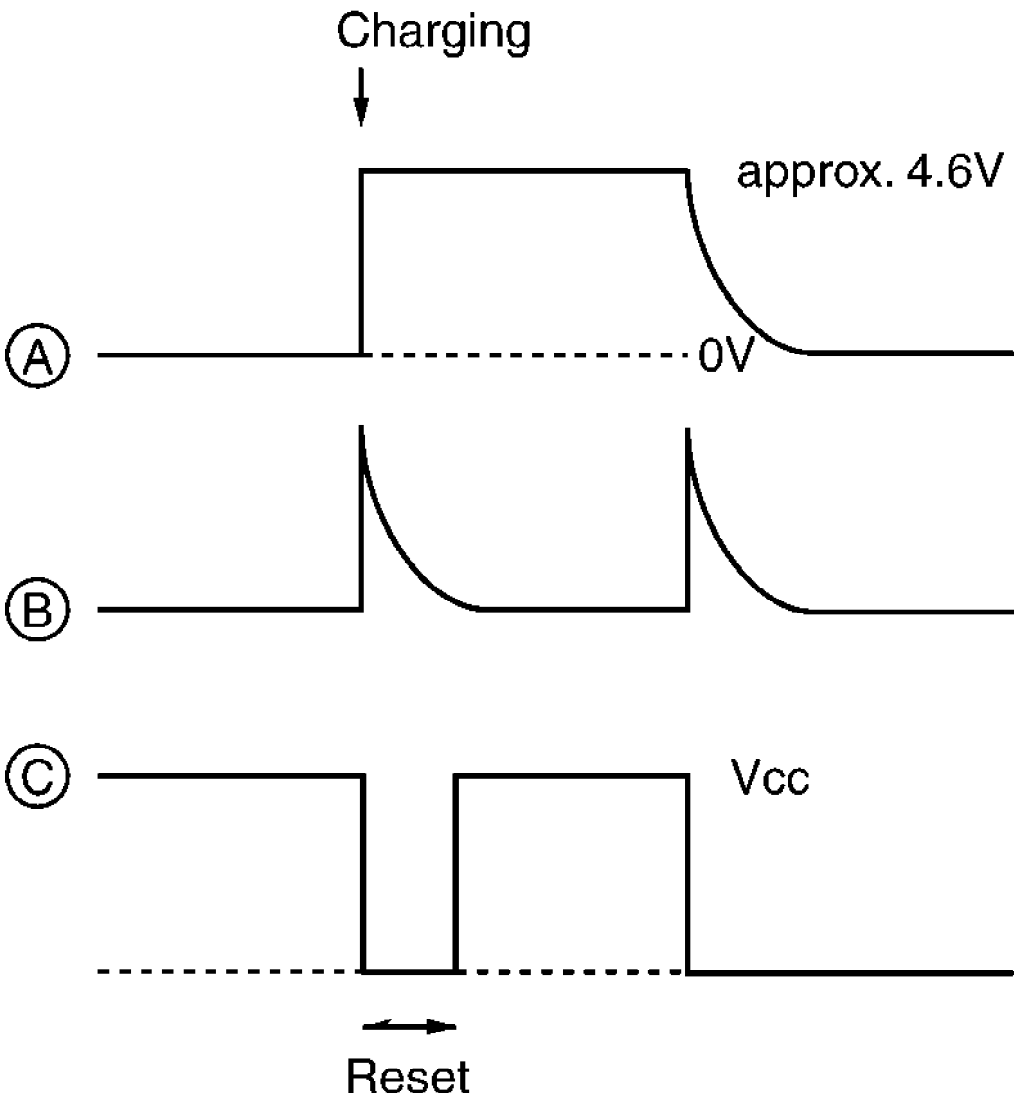


Fig. 5

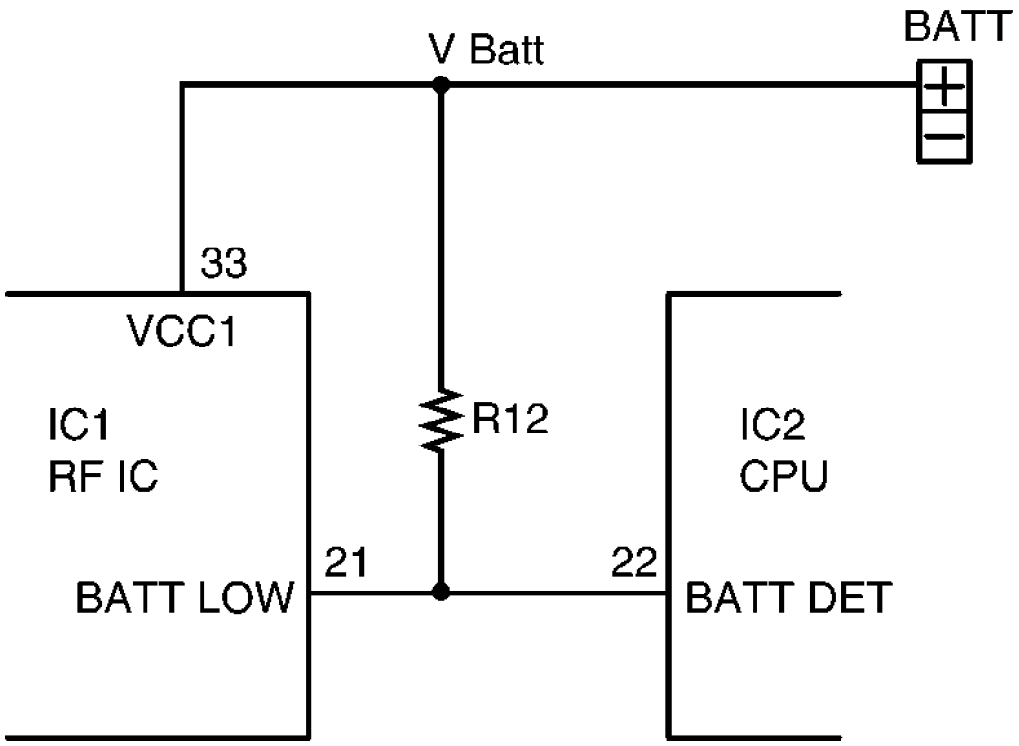


20.2. Battery Low / Power Down Detector

Circuit Operation:
"Battery Low" and "Power Down" are detected by RF IC which check the voltage from battery. Shortly, every detected blocks are inside of RF IC. The detected voltage is as follows;

- Battery Low
Battery voltage : V(Batt) < 3.457V
The CPU detects this level and "Recharge battery" LED starts flashing.
- Power Down
Battery voltage : V(Batt) < 3.0V
The output of RF IC (P-DOWN) becomes low level, then CPU stops working to keep the data (CH number, ID Code, etc.)

Fig. 6



21. CPU DATA (Base Unit)

21.1. IC2

Pin	Description	I/O	High	Hi-z	Low
1	NC	A.O	-	-	-
2	NC	A.I	-	-	-
3	NC	D.I	-	-	-
4	PWRDET	D.I	Active	-	Normal
5	DTMF4	D.O	Active	-	Normal
6	DTMF3	D.O	Active	-	Normal
7	DTMF2	D.O	Active	-	Normal
8	DTMF1	D.O	Active	-	Normal
9	DTMF0	D.O	Active	-	Normal
10	RXD	D.I	-	-	-
11	COUNT0	D.I	-	-	-
12	ASTB	D.O	Active	-	Normal
13	ADAT	D.O	-	-	Normal
14	NC	-	-	-	-
15	ACLK	D.O	-	-	Normal
16	PULSEMUTE	D.O	Active	-	Normal
17	TXD	D.O	Active	Normal	Active
18	CHGDET	D.I	Active	-	Normal
19	CNDET	D.I	Active	-	Normal
20	VTX	D.O	Normal	-	Active
21	HOOK	D.O	Active	-	Normal
22	PAGE	D.I	Normal	-	Active
23	COUNT1	D.I	-	-	-
24	RINGDET	D.I	-	-	-
25	CHARG-CNT	D.O	Normal	-	Active
26	LINELED	D.O	Normal	-	Active
27	RST	D.I	-	-	-
28	VDD	A.I	-	-	-

22. CPU DATA (Handset)

22.1. IC2

Pin	Description	I/O	High	Hi-z	Low
1	ADAT	D.O	-	-	Normal
2	ACLK	D.O		-	Normal
3	RXPWR	D.O	Normal	-	Active
4	RXD	D.I	-	-	-
5	BACKLED	D.O	Active	-	Normal
6	TALKLED	D.O	Normal	-	Active
7	LOWLED	D.O	Normal	-	Active
8	COL3	D.I	Normal	-	Active
9	COL2	D.I	Normal	-	Active
10	COL1	D.I	Normal	-	Active
11	COL0	D.I	Normal	-	Active
12	NC	D.O	Normal	-	-
13	NC	D.I	-	-	Normal
14	RESET	D.I	Normal	-	Reset
15	XIN	A.I	-	-	-
16	XOUT	-	-	-	-
17	GND	-	-	-	-
18	NC	-	-	-	-
19	OPTION 0	D.I	-	-	-
20	OPTION 1	D.I	-	-	-
21	OPTION 2	D.I	-	-	-
22	BATTDET	D.I	Active	-	Normal
23	CRDET	D.I	Active	-	Normal
24	NC	D.O	Normal	-	-
25	NC	D.O	Normal	-	-
26	NC	D.O	Normal	-	-
27	NC	D.O	Normal	-	-
28	NC	D.O	Normal	-	-
29	ROW 0	D.O	Normal	-	Active
30	ROW 1	D.O	Normal	-	Active
31	ROW 2	D.O	Normal	-	Active
32	ALERT	D.O	Normal	-	Active
33	ROW 3	D.O	Normal	-	Active
34	ROW 4	D.O	Normal	-	Active
35	ROW 5	D.O	Normal	-	Active
36	TXD	D.O	Active	Normal	Active
37	CHGDET	D.I	Active	-	Normal
38	XTIN	A.I	-	-	-
39	XTOUT	A.O	-	-	-
40	VDD	A.I	-	-	-
41	BUZCNTL	D.O	Active	-	Normal
42	VOL 1	D.O	Active	-	Normal
43	VOL 2	D.O	Active	-	Normal
44	RF-STB	D.O	Active	-	Normal

23. RF IC (Base Unit and Handset)

23.1. IC1

Pin	Description	I/O	Pin	Description	I/O
1	TX IN	A.I	25	FIL-IN	A.I
2	VCC3	A.I	26	FIL-OUT	A.O
3	LO1	-	27	DET OUT	A.O
4	LO2	-	28	QUAD	-
5	S-OUT	D.O	29	IF OUT	A.O
6	CLK	D.I	30	GND 2	-
7	DATA	D.I	31	DEC	-
8	STB	D.I	32	IF IN	A.I
9	FL-OUT	A.O	33	VCC1	A.I
10	FL-IN	A.I	34	2ND MIX OUT	A.O
11	COMP-OUT	A.O	35	N-REC	-
12	C-NF	-	36	2ND MIX IN	A.I
13	AF-OUT	A.O	37	E-REC	-
14	AF-IN	A.I	38	1ST MIX OUT	A.O
15	REF-IN	A.I	39	VREF	-
16	REF-OUT	A.O	40	1ST MIX IN	A.I
17	EXP-OUT	A.O	41	VCC2	A.O
18	REC-IN	A.I	42	VCO CONT	A.I
19	RO1	A.O	43	VCO1	-
20	RO2	A.O	44	VCO2	-
21	BAT. ALM	D.O	45	C-RECT	-
22	RSSI	A.O	46	RX CF	A.O
23	DATA O/P	A.O	47	TX CF	A.O
24	DATA I/P	A.I	48	PLL GND	-

24. HOW TO REPLACE FLAT PACKAGE IC

24.1. Preparation

- PbF (: Pb free) Solder

- Soldering Iron

Tip Temperature of 700°F ± 20°F (370°C ± 10°C)

Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.

- Flux

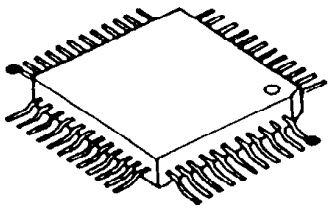
Recommended Flux: Specific Gravity →0.82.

Type →RMA (lower residue, non-cleaning type)

Note: See ABOUT LEAD FREE SOLDER (PbF: Pb free) ().

24.2. Procedure

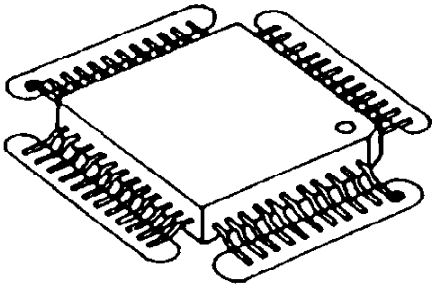
1. Tack the flat pack IC to the PCB by temporarily soldering two diagonally opposite pins in the correct positions on the PCB.



● – – – – – –Temporary soldering point.

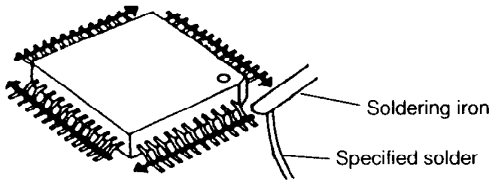
Be certain each pin is located over the correct pad on the PCB.

2. Apply flux to all of the pins on the IC.



– – – – – – Flux

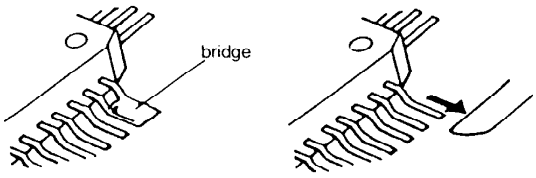
3. Being careful to not unsolder the tack points, slide the soldering iron along the tips of the pins while feeding enough solder to the tip so that it flows under the pins as they are heated.



24.3. Modification Procedure of Bridge

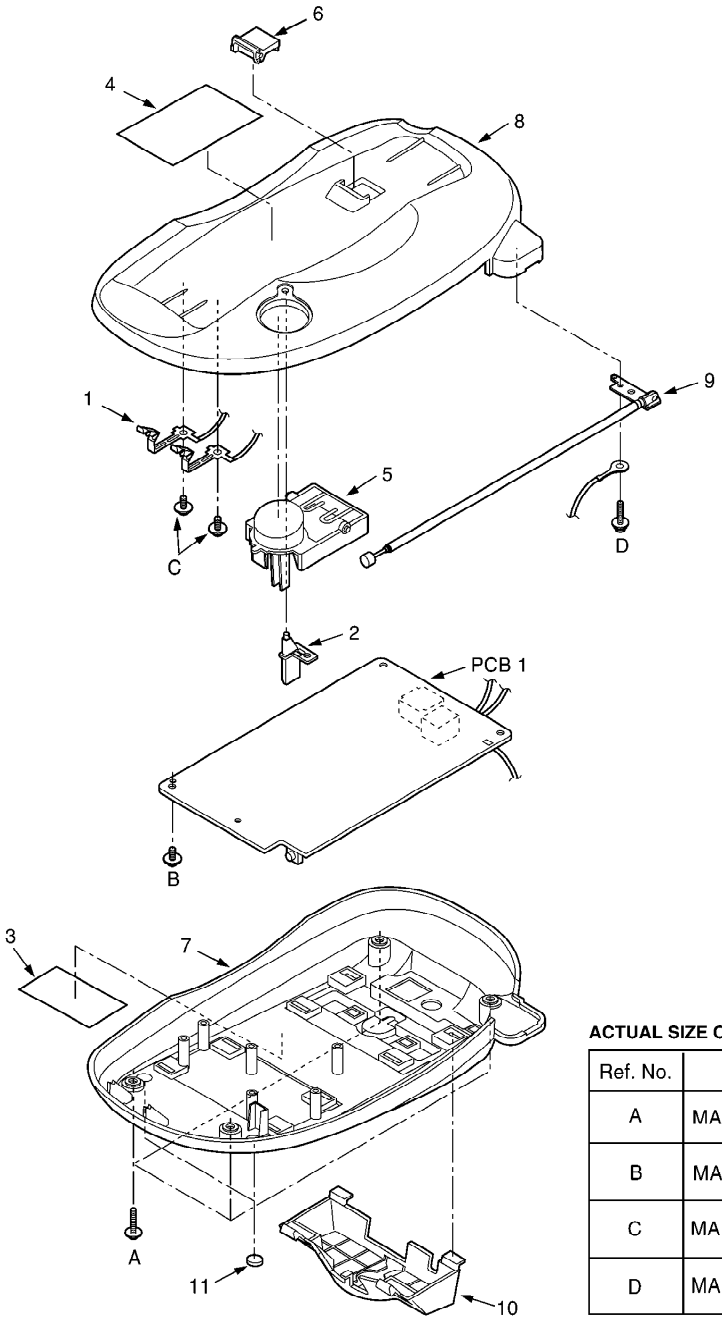
1. Add a small amount of solder to the bridged pins.

2. With a hot iron, use a sweeping motion along the flat part of the pin to draw the solder from between the adjacent pads.



25. CABINET AND ELECTRICAL PARTS LOCATION

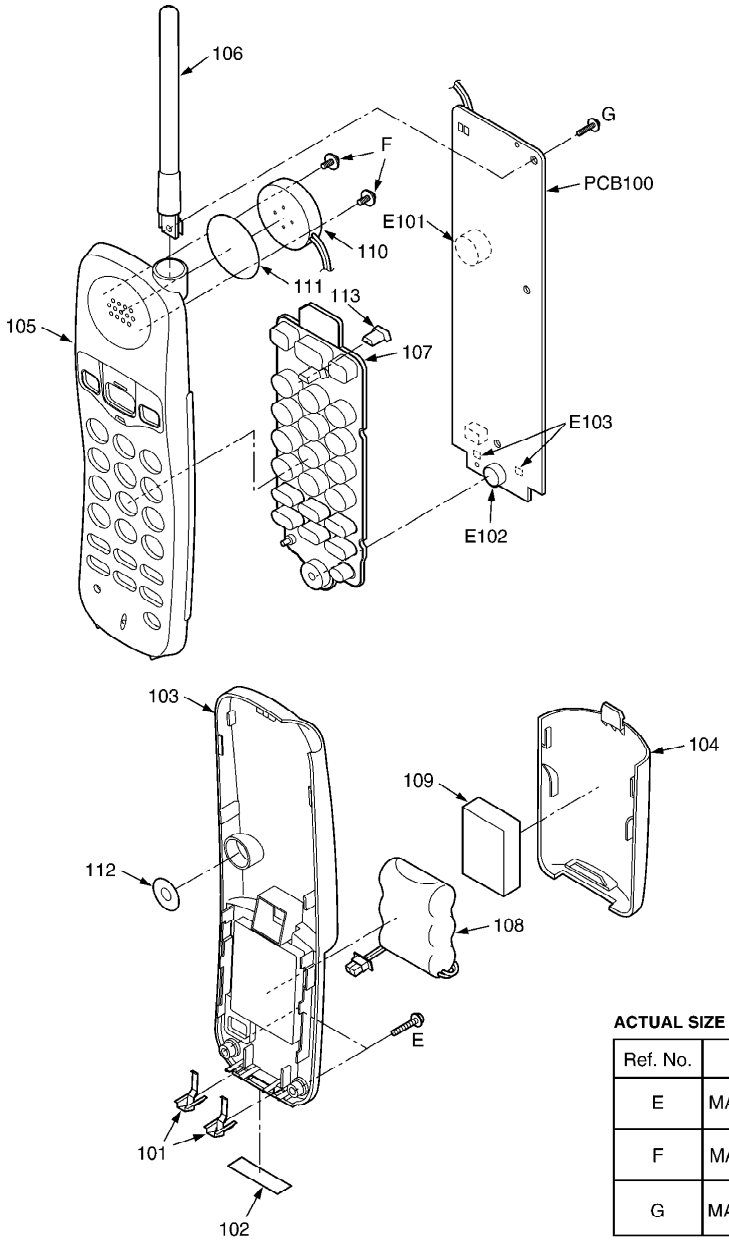
(BASE UNIT)



ACTUAL SIZE OF SCREWS

Ref. No.	Part No.	Screw
A	MAB0G261247	
B	MAB0G260640	
C	MAB0G260640	
D	MAB0E261244	

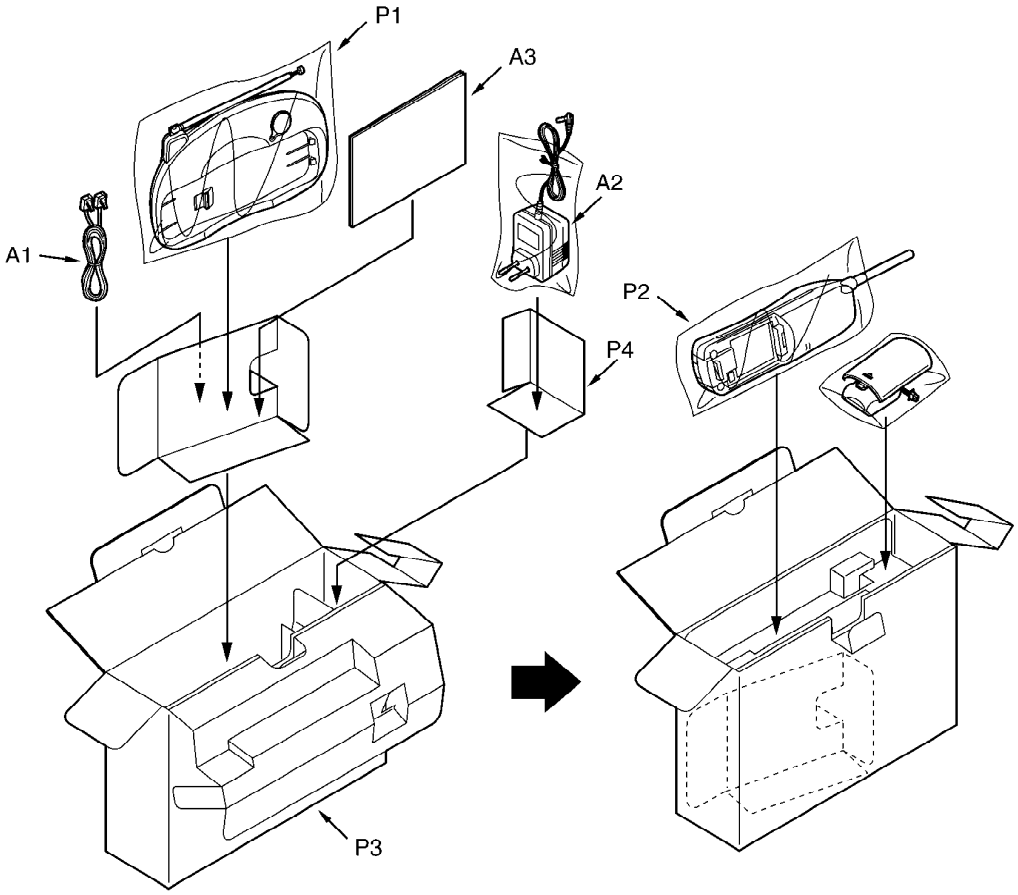
26. CABINET AND ELECTRICAL PARTS LOCATION (HANDET)



ACTUAL SIZE OF SCREWS

Ref. No.	Part No.	Screw
E	MAB0G261247	
F	MAB0G260640	
G	MAB0E261244	

27. ACCESSORIES AND PACKING MATERIALS



28. REPLACEMENT PARTS LIST

Note:

1. RTL (Retention Time Limited)
The marking (RTL) indicates that the Retention Time is limited for this item.
After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability depends on the type of assembly and the laws governing parts and product retention.
At the end of this period, the assembly will no longer be available.

2. Important safety notice
Components identified by the ⚠ mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture's parts.

3. The S mark indicates service standard parts and may differ from production parts.

4. RESISTORS & CAPACITORS

Unless otherwise specified;
All resistors are in ohms (Ω) K=1000 Ω , M=1000k Ω
All capacitors are in MICRO FARADS (μ F) P= μ μ F
***Type & Wattage of Resistor**

Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PQRD:Carbon	ER0:Metal Film	ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor	ECCD,ECKD,ECBT,PQCBC : Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG : Polyester
PQCUV:Chip	ECEA,ECSZ : Electrolytic
ECQMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V
2E:250V	2:200V	1V:35V	1C :16V	1J :63V
2H:500V		0J:6.3V	1E,25:25V	2A :100V

28.1. Base Unit

28.1.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
1	PQJT10180Z	CHARGE TERMINAL	
2	PQHR10998Z	LED LENS	
3	PQGT16514Z	NAME LABEL (for KX-TC2000SNB)	
3	PQGT16498Z	NAME LABEL (for KX-TC2000SNS)	
4	PQQT22633Z	CHARGE LABEL	
5	PQBC10389Z1	LOCATOR BUTTON (for KX-TC2000SNB)	
5	PQBC10389Y2	LOCATOR BUTTON (for KX-TC2000SNS)	
6	PQKE10335Z1	HOOK LEVER (for KX-TC2000SNB)	
6	PQKE10335Z4	HOOK LEVER (for KX-TC2000SNS)	
7	PQKF10597Z1	LOWER CABINET (for KX-TC2000SNB)	
7	PQKF10597Z2	LOWER CABINET (for KX-TC2000SNS)	
8	PQKM10607Z1	UPPER CABINET (for KX-TC2000SNB)	
8	PQKM10607Y2	UPPER CABINET (for KX-TC2000SNS)	
9	PQSA10105Y	ANTENNA	
10	PQKL10056Z1	WALL MOUNT ADAPTOR (for KX-TC2000SNB)	
10	PQKL10056Z2	WALL MOUNT ADAPTOR (for KX-TC2000SNS)	
11	LCBT9300013	FOOT RUBBER	

28.1.2. MAIN P.C.BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PQWPC2000SNH	MAIN P.C.BOARD ASS'Y (RTL)	
		(ICS)	
IC1	SA133122409	IC	
IC2	SA138740C28	IC	
IC3	SA1S0032402	IC	
		(TRANSISTORS)	
Q1	BB230024104	TRANSISTOR(SI)	
Q2	SB0I0390601	TRANSISTOR(SI)	
Q3	SB1D0390401	TRANSISTOR(SI)	
Q4	SB1D0390401	TRANSISTOR(SI)	
Q5	SB1D0390401	TRANSISTOR(SI)	
Q6	SB1I0390408	TRANSISTOR(SI)	
Q7	SB1I0390408	TRANSISTOR(SI)	
Q11	SB1I0390408	TRANSISTOR(SI)	
Q14	SB0I0390601	TRANSISTOR(SI)	
Q17	SB1I0390408	TRANSISTOR(SI)	
Q18	BB1M0390401	TRANSISTOR(SI)	
Q19	BB1M0390401	TRANSISTOR(SI)	
Q20	SB1I0390408	TRANSISTOR(SI)	
Q21	SB1I0390408	TRANSISTOR(SI)	
Q24	BB1M0390401	TRANSISTOR(SI)	
Q25	SB1I0390408	TRANSISTOR(SI)	
Q401	SB1I0390408	TRANSISTOR(SI)	
Q402	SB0I0390601	TRANSISTOR(SI)	
Q403	SB1I0390408	TRANSISTOR(SI)	
		(DIODES)	
D1	SC1GM414809	DIODE(SI)	
D2	BC2W0400401	DIODE(SI)	
D3	BC2W0400401	DIODE(SI)	
D4	BC2W0400401	DIODE(SI)	
D5	BC2W0400401	DIODE(SI)	
D6	BC2W0400401	DIODE(SI)	
D7	VA02700A401	DIODE(SI)	
D8	SC1GM414809	DIODE(SI)	
D11	SC1GM414809	DIODE(SI)	
D404	BC4579C7V50	DIODE(SI)	
DV1	BC6K0025101	DIODE(SI)	
ZD1	BC050474801	DIODE(SI)	
ZD2	BC050474801	DIODE(SI)	
ZD3	SC4555C4V71	DIODE(SI)	
ZD4	BC4579C8V21	DIODE(SI)	
ZD5	SC4555C4V71	DIODE(SI)	
ZD8	BC4579C5V65	DIODE(SI)	
ZD9	BC4579C5V65	DIODE(SI)	
ZD10	SC4555C1506	DIODE(SI)	
ZD11	SV110201203	DIODE(SI)	
ZD12	SC4555C1506	DIODE(SI)	
		(LED)	
LED1	SC4555C4V71	LED	
		(COILS)	
L1	CL3101R5JT6	COIL	
L3	CL310012JS1	COIL	
L4	CL310012JT0	COIL	
L5	CL310012JT0	COIL	

Ref. No.	Part No.	Part Name & Description	Remarks
L6	CL310012JT0	COIL	
L7	CL310012JT0	COIL	
L8	CL310012JT0	COIL	
L9	CL310012JT0	COIL	
L10	CL310R68JS9	COIL	
L11	CL310012JS1	COIL	
DPX1	BDFL0104605	COIL	
		(JACKS)	
JK1	DC72P120018	JACK	
JK2	DC71P120023	JACK	
		(CERAMIC CAPACITORS)	
C76	CATZ681KC68	CERAMIC CAPACITOR	
C80	CATZ681KC68	CERAMIC CAPACITOR	
C95	CB114714205	CERAMIC CAPACITOR	
		(CERAMIC FILTERS)	
CF1	BDFA107MA07	CERAMIC FILTER	
CF2	BDFJ0455E00	CERAMIC FILTER	
		(CRYSTAL OSCILLATORS)	
X1	BD1H1024503	CRYSTAL OSCILLATOR	
X2	BD5H0795210	CRYSTAL OSCILLATOR	
		(TRANSFORMERS)	
T1	CLIP1200053	TRANSFORMER	
T2	CLIP1200037	TRANSFORMER	
T5	CLIP1200029	TRANSFORMER	
T6	CLIP1200045	TRANSFORMER	
T7	DG0P1200019	TRANSFORMER	
		(RESISTORS)	
R1	ERJ3GEYJ470	47	
R2	ERJ3GEYJ331	330	
R3	ERJ3GEYJ153	15K	
R4	ERJ3GEYJ822	8.2K	
R5	ERJ3GEYJ103	10K	
R6	ERJ3GEYJ103	10K	
R7	ERJ3GEYJ334	330K	
R8	ERJ3GEYJ103	10K	
R10	ERJ3GEYJ393	39K	
R12	ERJ3GEYJ101	100	
R13	ERJ3GEYJ513	51K	
R14	ERJ3GEYJ103	10K	
R15	ERJ3GEYJ562	5.6K	
R16	ERJ3GEYJ153	15K	
R18	ERJ3GEYJ152	1.5K	
R19	ERJ3GEYJ164	160K	
R20	ERJ3GEYJ475	4.7M	
R21	ERJ3GEYJ823	82K	
R22	ERJ3GEYJ472	4.7K	
R23	ERJ3GEYJ104	100K	
R24	ERJ3GEYJ103	10K	
R25	ERJ3GEYJ334	330K	
R26	ERJ3GEYJ154	150K	
R30	ERJ3GEYJ104	100K	
R31	ERJ3GEYJ473	47K	
R33	ERJ3GEYJ470	47	
R35	ERJ3GEYJ101	100	

Ref. No.	Part No.	Part Name & Description	Remarks
R36	ERJ3GEYJ224	220K	
R37	ERJ3GEYJ101	100	
R38	ERJ3GEYJ104	100K	
R40	ERJ3GEYJ223	22K	
R41	ERJ3GEYJ563	56K	
R42	ERJ3GEYJ103	10K	
R43	ERJ3GEYJ103	10K	
R44	ERJ3GEYJ104	100K	
R45	ERJ3GEYJ394	390K	
R46	ERJ3GEYJ222	2.2K	
R48	ERJ3GEYJ223	22K	
R49	ERJ3GEYJ753	75K	
R50	ERJ3GEYJ822	8.2K	
R51	ERJ3GEYJ152	1.5K	
R53	ERJ3GEYJ153	15K	
R54	ERJ3GEYJ153	15K	
R55	ERJ3GEYJ681	680	
R56	ERJ3GEYJ222	2.2K	
R57	ERJ3GEYJ224	220K	
R58	ERJ3GEYJ221	220	
R59	ERJ3GEYJ104	100K	
R60	ERJ3GEYJ223	22K	
R62	ERJ3GEYJ104	100K	
R64	ERDS2TJ103	10K	
R68	ERJ3GEYJ104	100K	
R74	ERJ3GEY0R00	0	
R75	ERJ3GEYJ103	10K	
R77	ERJ3GEYJ203	20K	
R78	ERJ3GEYJ393	39K	
R79	ERJ3GEYJ823	82K	
R80	ERJ3GEYJ222	2.2K	
R81	ERJ3GEYJ164	160K	
R82	ERJ3GEYJ103	10K	
R83	ERJ3GEYJ103	10K	
R84	ERJ3GEYJ562	5.6K	
R85	ERJ3GEYJ103	10K	
R86	ERJ3GEYJ473	47K	
R88	ERJ3GEYJ103	10K	
R89	ERJ3GEYJ103	10K	
R90	ERJ3GEYJ274	270K	
R94	ERJ3GEYJ104	100K	
R95	ERJ3GEYJ392	3.9K	
R96	ERJ3GEYJ274	270K	
R97	ERJ3GEYJ102	1K	
R100	ERJ3GEYJ222	2.2K	
R103	ERJ3GEYJ223	22K	
R104	ERJ3GEYJ472	4.7K	
R105	ERJ3GEYJ682	6.8K	
R106	ERDS2TJ220	22	
R108	ERJ3GEYJ472	4.7K	
R109	ERJ3GEYJ334	330K	
R111	ERJ3GEYJ181	180	
R114	ERJ3GEYJ223	22K	
R115	ERJ3GEYJ563	56K	

Ref. No.	Part No.	Part Name & Description	Remarks
R116	ERJ3GEY0R00	0	
R118	ERDS2TJ121	120	
R119	ERJ3GEYJ823	82K	
R120	ERJ3GEY0R00	0	
R122	ERJ3GEYJ681	680	
R123	ERJ3GEYJ223	22K	
R126	ERJ3GEYJ471	470	
R131	ERJ3GEYJ104	100K	
R132	ERJ3GEYJ222	2.2K	
R133	ERJ3GEYJ390	39	
R141	ERJ3GEYJ512	5.1K	
R142	ERDS2TJ220	22	
R143	ERJ3GEYJ514	510K	
R144	ERDS2TJ106	10M	
R145	ERJ3GEYJ102	1K	
R146	ERJ3GEYJ153	15K	
R148	ERJ3GEYJ103	10K	
R149	ERJ3GEYJ182	1.8K	
R150	ERJ3GEYJ514	510K	
R152	ERDS2TJ106	10M	
R153	ERJ3GEYJ105	1M	
R154	ERJ3GEYJ330	33	
R155	ERJ3GEYJ470	47	
R156	ERJ3GEYJ470	47	
R159	ERJ3GEYJ104	100K	
R160	ERJ3GEY0R00	0	
R161	ERJ3GEY0R00	0	
R166	ERJ3GEYJ470	47	
R167	ERJ3GEYJ103	10K	
R170	ERJ3GEYJ102	1K	
R172	ERDS2TJ103	10K	
R173	ERDS2TJ102	1K	
R174	ERDS2TJ102	1K	
R180	ERJ3GEYJ563	56K	
R183	ERJ3GEYJ106	10M	
R184	ERDS2TJ106	10M	
R195	ERDS2TJ472	4.7K	
R197	ERJ3GEYJ223	22K	
R198	ERJ3GEY0R00	0	
R401	ERJ3GEYJ102	1K	
R402	ERJ3GEYJ104	100K	
R403	ERJ3GEYJ104	100K	
R404	ERJ3GEYJ104	100K	
R405	ERJ3GEYJ104	100K	
R406	ERJ3GEYJ104	100K	
R407	ERJ3GEYJ472	4.7K	
R408	ERJ3GEYJ103	10K	
R409	ERJ3GEYJ824	820K	
R410	ERJ3GEYJ103	10K	
C110	ERJ3GEYJ102	1K	
		(CAPACITORS)	
C1	ECEA1AU470	47	
C2	ECUV1H104ZFV	0.1	
C4	ECUV1H103KBV	0.01	

Ref. No.	Part No.	Part Name & Description	Remarks
C6	ECUV1H104ZFV	0.1	
C7	ECUV1H102KBV	0.001	
C8	ECUV1H104ZFV	0.1	
C9	ECUV1H471JCV	470P	S
C10	ECUV1H471JCV	470P	S
C11	ECUV1C474ZFV	0.47	
C12	ECUV1H103KBV	0.01	
C15	ECEA1HKA2R2	2.2	
C16	ECUV1H270JCV	27P	
C17	ECEA1CKA100	10	
C18	ECUV1H473MDV	0.047	S
C19	ECUV1H102KBV	0.001	
C20	ECEA1HKA2R2	2.2	
C22	ECUV1H103KBV	0.01	
C23	ECUV1H103KBV	0.01	
C24	ECUV1E223KBV	0.022	S
C25	ECUV1H822KBV	0.0082	
C26	ECUV1H8R2CCV	8.2	
C27	ECUV1H103KBV	0.01	
C28	ECUV1H153KBV	0.015	
C29	ECUV1H104ZFV	0.1	
C30	ECEA1HKA2R2	2.2	
C31	ECUV1H103KBV	0.01	
C32	ECEA1HKA2R2	2.2	
C33	ECUV1H101JCV	100P	
C34	ECUV1H101JCV	100P	
C35	ECUV1H180JCV	18P	
C36	ECUV1H101JCV	100P	
C37	ECUV1H151JCV	150P	
C38	ECEA1CKA100	10	
C39	ECUV1H103KBV	0.01	
C40	ECUV1H270JCV	27P	
C41	ECEA1AKA470	47	
C42	ECEA1HKA2R2	2.2	
C43	ECUV1H103KBV	0.01	
C44	ECUV1H472KBV	0.0047	
C45	ECUV1C563KBV	0.056	
C46	ECUV1H102KBV	0.001	
C47	ECUV1H103KBV	0.01	
C48	ECUV1C223KBV	0.022	
C49	ECUV1H103KBV	0.01	
C50	ECEA1CKA220	22	
C51	ECUV1H102KBV	0.001	
C52	ECUV1C223KBV	0.022	
C53	ECUV1H050CCV	5P	
C54	ECUV1H010CCV	1P	
C55	ECUV1H103KBV	0.01	
C56	ECUV1H050CCV	5P	
C57	ECUV1H390JCV	39P	
C58	ECUV1H682KBV	0.0068	
C59	ECUV1H390JCV	39P	
C60	ECUV1H100DCV	10P	S
C61	ECUV1H104ZFV	0.1	
C62	ECUV1H390JCV	39P	

Ref. No.	Part No.	Part Name & Description	Remarks
C63	ECUV1H103KBV	0.01	
C64	ECUV1H104ZFV	0.1	
C65	ECUV1H220JCV	22P	
C66	ECEA0JKA102	1000	
C67	ECUV1H220JCV	22P	
C69	ECUV1H271KBV	270P	
C70	ECUV1C223KBV	0.022	
C72	ECUV1E223KBV	0.022	S
C73	ECUV1H104ZFV	0.1	
C74	ECUV1H104ZFV	0.1	
C75	ECUV1C563KBV	0.056	
C77	ECUV1H151JCV	150P	
C78	ECEA1AKA471	470	
C79	ECUV1H104ZFV	0.1	
C82	ECUV1H104ZFV	0.1	
C85	ECUV1C563KBV	0.056	
C90	ECUV1H123KBV	0.012	
C92	ECUV1H104ZFV	0.1	
C93	ECUV1H562KBV	0.0056	
C94	ECEA1AKA101	100	
C96	ECUV1H103KBV	0.01	S
C97	ECEA1HKA4R7	4.7	
C98	ECEA1CKA220	22	
C99	ECUV1H103KBV	0.01	
C101	ECUV1H562KBV	0.0056	
C102	ECEA1EKA221	220	
C103	ECEA1AKA470	47	
C104	ECUV1E104ZFV	0.1	
C105	ECEA1AKA101	100	
C106	ECUV1A105ZFV	1	
C107	ECUV1H104ZFV	0.1	
C108	ECUV1H104ZFV	0.1	
C109	ECUV1H152KBV	0.0015	
C134	ECUV1H103KBV	0.01	
C135	ECUV1H103KBV	0.01	
C136	ECUV1H020CCV	2P	
C401	ECUV1H104ZFV	0.1	
C402	ECUV1C224KBV	0.22	
		(OTHERS)	
R107	CQ63180R522	VARIABLE RESISTOR	
RY1	DCR000105H7	RELAY	
SW1	DETP1200017	PUSH SWITCH	
VC1	CR01020RRT8	TRIMMER CAPACITOR	
ZNR1	VA107D271K1	VARISTOR	

28.2. Handset

28.2.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
101	PQJT10182Z	CHARGE TERMINAL	
102	PQGT16515Z	NAME LABEL (for KX-TC2000SNB)	
102	PQGT16501Z	NAME LABEL (for KX-TC2000SNS)	
103	PQKF10535Z1	REAR CABINET (for KX-TC2000SNB)	
103	PQKF10535Z4	REAR CABINET (for KX-TC2000SNS)	
104	PQKK10124Z1	BATTERY COVER (for KX-TC2000SNB)	
104	PQKK10124Z4	BATTERY COVER (for KX-TC2000SNS)	
105	PQKM10510Z1	FRONT CABINET (for KX-TC2000SNB)	
105	PQKM10510Z4	FRONT CABINET (for KX-TC2000SNS)	
106	PQSA10130X	ANTENNA (for KX-TC2000SNB)	
106	PQSA10130W	ANTENNA (for KX-TC2000SNS)	
107	PQSX10191Z	KEYBOARD SWITCH (for KX-TC2000SNB)	
107	PQSX10191W	KEYBOARD SWITCH (for KX-TC2000SNS)	
108	PQXA36ASVC	BATTERY	
109	FH1T1200011	CUSHION, URETHANE FORM	
110	CG2P1200021	SPEAKER	
111	FE4T1200019	SPEAKER NET	
112	FH2T1200012	BUZZER SHEET	
113	PQHR10896Z	LIGHT PIPE	

28.2.2. MAIN P.C.BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB100	PQWPC2000SNR	MAIN P.C.BOARD ASS'Y (RTL)	
		(ICS)	
IC1	SA133122409	IC	
IC2	SA138780C03	IC	
		(TRANSISTORS)	
Q1	BB230024104	TRANSISTOR(SI)	
Q2	SB1I0390408	TRANSISTOR(SI)	
Q4	SB0I0390601	TRANSISTOR(SI)	
Q5	SB1D0390401	TRANSISTOR(SI)	
Q6	SB1D0390401	TRANSISTOR(SI)	
Q7	SB0I0390601	TRANSISTOR(SI)	
Q8	SB1I0390408	TRANSISTOR(SI)	
Q9	SB1I0390408	TRANSISTOR(SI)	
Q11	SB1I0390408	TRANSISTOR(SI)	
Q12	SB1I0390408	TRANSISTOR(SI)	
Q200	SB1I0390408	TRANSISTOR(SI)	
		(DIODES)	
D1	SC1GM414809	DIODE(SI)	
D3	SC1GM414809	DIODE(SI)	
DV1	BC6K0025101	DIODE(SI)	
ZD1	BC4579C1005	DIODE(SI)	
ZD3	SC455C5V601	DIODE(SI)	
		(LEDS)	
LED1	SC5E0192115	LED	
LED2	SC5E0192115	LED	
LED3	SC5E0192115	LED	
LED4	SC5E0192115	LED	
LED5	SC5E0192115	LED	
LED6	SC5E0192123	LED	
		(COILS)	

Ref. No.	Part No.	Part Name & Description	Remarks
L2	CL310012JS1	COIL	
L3	CL310012JS1	COIL	
L4	CL310012JT0	COIL	
L5	CL310012JT0	COIL	
L6	CL310R68JT7	COIL	
L7	SH590121N75	COIL	
L200	CL3101R2JS9	COIL	
DPX1	BDFL0104613	COIL	
		(CONNECTOR)	
BATT1	DCB002X1164	CONNECTOR	
		(CERAMIC FILTERS)	
CF1	BDFA107MA07	CERAMIC FILTER	
CF2	BDFJ0455E00	CERAMIC FILTER	
		(CRYSTAL OSCILLATORS)	
X1	BD5H1024501	CRYSTAL OSCILLATOR	
X2	BD8Z3276800	CRYSTAL OSCILLATOR	
X3	BD5H0399209	CRYSTAL OSCILLATOR	
		(TRANSFORMERS)	
T1	CLIP1200053	TRANSFORMER	
T3	CLIP1200070	TRANSFORMER	
T5	CLIP1200061	TRANSFORMER	
T6	CLIP1200088	TRANSFORMER	
		(RESISTORS)	
R1	ERJ3GEYJ331	330	
R2	ERJ3GEYJ153	15K	
R3	ERJ3GEYJ682	6.8K	
R5	ERJ3GEYJ103	10K	
R6	ERJ3GEYJ103	10K	
R8	ERJ3GEYJ224	220K	
R9	ERJ3GEYJ823	82K	
R10	ERJ3GEYJ331	330	
R11	ERJ3GEYJ562	5.6K	
R12	ERJ3GEYJ224	220K	
R13	ERJ3GEYJ683	68K	
R14	ERJ3GEYJ153	15K	
R16	ERJ3GEYJ103	10K	
R17	ERJ3GEYJ682	6.8K	
R18	ERJ3GEYJ103	10K	
R19	ERJ3GEYJ472	4.7K	
R21	ERJ3GEYJ363	36K	
R23	ERJ3GEYJ473	47K	
R24	ERJ3GEYJ472	4.7K	
R25	ERJ3GEYJ913	91K	
R26	ERJ3GEYJ103	10K	
R28	ERJ3GEYJ514	510K	
R29	ERJ3GEYJ682	6.8K	
R30	ERJ3GEY0R00	0	
R34	ERJ3GEYJ224	220K	
R35	ERJ3GEYJ473	47K	
R36	ERJ3GEYJ332	3.3K	
R37	ERJ3GEYJ102	1K	
R38	ERJ3GEYJ470	47	
R39	ERJ3GEYJ224	220K	
R40	ERJ3GEYJ101	100	

Ref. No.	Part No.	Part Name & Description	Remarks
R41	ERJ3GEYJ124	120K	
R42	ERJ3GEYJ223	22K	
R43	ERJ3GEYJ104	100K	
R44	ERJ3GEYJ393	39K	
R45	ERJ3GEYJ104	100K	
R46	ERJ3GEYJ514	510K	
R47	ERJ3GEYJ222	2.2K	
R48	ERJ3GEYJ223	22K	
R49	ERJ3GEYJ473	47K	
R50	ERJ3GEYJ822	8.2K	
R51	ERJ3GEYJ272	2.7K	
R52	ERJ3GEYJ222	2.2K	
R53	ERJ3GEYJ820	82	
R54	ERJ3GEYJ104	100K	
R55	ERJ3GEYJ221	220	
R56	ERJ3GEYJ122	1.2K	
R57	ERJ3GEYJ102	1K	
R58	ERJ3GEYJ102	1K	
R59	ERJ3GEYJ222	2.2K	
R60	ERJ3GEYJ222	2.2K	
R61	ERJ3GEYJ331	330	
R62	ERJ3GEYJ222	2.2K	
R63	ERJ3GEYJ103	10K	
R64	ERJ3GEYJ103	10K	
R65	ERJ3GEYJ331	330	
R66	ERJ3GEYJ222	2.2K	
R67	ERJ3GEYJ222	2.2K	
R68	ERJ3GEYJ103	10K	
R69	ERJ3GEYJ222	2.2K	
R70	ERJ3GEYJ222	2.2K	
R73	ERJ3GEYJ105	1M	
R74	ERJ3GEYJ104	100K	
R75	ERJ3GEYJ104	100K	
R76	ERJ3GEYJ104	100K	
R77	ERJ3GEYJ103	10K	
R78	ERJ3GEYJ104	100K	
R79	ERJ3GEYJ105	1M	
R80	ERJ3GEYJ105	1M	
R82	ERJ3GEY0R00	0	
R83	ERJ3GEY0R00	0	
R84	ERJ3GEYJ105	1M	
R85	ERJ3GEYJ102	1K	
R86	ERJ3GEYJ104	100K	
R87	ERJ3GEYJ104	100K	
R93	ERJ3GEYJ103	10K	
R94	ERJ3GEYJ334	330K	
R95	ERJ3GEYJ393	39K	
R96	ERJ3GEYJ470	47	
R97	ERJ3GEYJ154	150K	
R99	ERJ3GEYJ472	4.7K	
R101	ERJ3GEYJ470	47	
R102	ERJ3GEYJ563	56K	
R103	ERJ3GEYJ105	1M	
R105	ERJ3GEYJ103	10K	

Ref. No.	Part No.	Part Name & Description	Remarks
R106	ERJ3GEYJ820	82	
R107	ERJ3GEYJ222	2.2K	
R108	ERJ3GEYJ102	1K	
R109	ERJ3GEYJ102	1K	
R110	ERJ3GEYJ102	1K	
R111	ERJ3GEYJ102	1K	
R112	ERJ3GEYJ102	1K	
R200	ERJ3GEYJ473	47K	
R201	ERJ3GEYJ330	33	
		(CAPACITORS)	
C1	ECEA1AKA470	47	
C2	ECUV1H104ZFV	0.1	
C5	ECUV1H104ZFV	0.1	
C6	ECUV1H102KBV	0.001	
C7	ECUV1H104ZFV	0.1	
C8	ECUV1H473MDV	0.047	S
C9	ECUV1H103KBV	0.01	
C10	ECUV1H560JCV	56P	
C12	ECEA1HKA2R2	2.2	
C13	ECUV1H270JCV	27P	
C14	ECUV1H103KBV	0.01	
C15	ECEA1CKA100	10	
C16	ECUV1H473MDV	0.047	S
C17	ECUV1H102KBV	0.001	
C18	ECEA1HKA2R2	2.2	
C21	ECUV1C223KBV	0.022	
C22	ECUV1H103KBV	0.01	
C23	ECUV1H102KBV	0.001	
C24	ECUV1H120JCV	12P	
C26	ECUV1H103KBV	0.01	
C27	ECUV1H104ZFV	0.1	
C28	ECUV1A224KBV	0.22	
C29	ECEA1HKA2R2	2.2	
C30	ECUV1H104ZFV	0.1	
C31	ECUV1H103KBV	0.01	
C32	ECUV1H104ZFV	0.1	
C33	ECUV1H104ZFV	0.1	
C34	ECUV1H681JCV	680P	S
C35	ECUV1H151JCV	150P	
C36	ECUV1H180JCV	18P	
C37	ECEA1AKA100	10	
C38	ECUV1H330JCV	33P	
C39	ECUV1H151JCV	150P	
C40	ECUV1H103KBV	0.01	
C41	ECUV1H220JCV	22P	
C42	ECEA1AKA470	47	
C43	ECEA1HKA2R2	2.2	
C44	ECUV1A105ZFV	1	
C45	ECUV1C563KBV	0.056	
C47	ECUV1A682KBV	0.0068	
C48	ECEA1AKA470	47	
C49	ECUV1C223KBV	0.022	
C50	ECUV1H103KBV	0.01	
C51	ECEA1CKA100	10	

Ref. No.	Part No.	Part Name & Description	Remarks
C52	ECUV1H103KBV	0.01	
C53	ECUV1E223KBV	0.022	
C54	ECUV1H100DCV	10P	S
C55	ECUV1H103KBV	0.01	
C56	ECUV1H050CCV	5P	
C57	ECUV1H150JCV	15P	
C58	ECUV1H103KBV	0.01	
C59	ECUV1H390JCV	39P	
C60	ECUV1H100DCV	10P	S
C61	ECUV1H104ZFV	0.1	
C62	ECUV1H390JCV	39P	
C63	ECEA1AKA101	100	
C64	ECUV1H103KBV	0.01	
C65	ECUV1H150JCV	15P	
C66	ECUV1H150JCV	15P	
C67	ECUV1H103KBV	0.01	
C68	ECUV1H104ZFV	0.1	
C69	ECUV1H104ZFV	0.1	
C70	ECUV1H300JCV	30P	
C71	ECUV1H300JCV	30P	
C72	ECUV1H104ZFV	0.1	
C73	ECUV1H104ZFV	0.1	
C74	ECUV1H473MDV	0.047	S
C75	ECUV1H103KBV	0.01	
C76	ECUV1H471JCV	470P	S
C77	ECUV1H471JCV	470P	S
C78	ECUV1H103KBV	0.01	
C79	ECUV1H103KBV	0.01	
C80	ECUV1H103KBV	0.01	
C84	ECUV1H104ZFV	0.1	
C85	ECUV1A105ZFV	1	
C86	ECUV1H104ZFV	0.1	
C88	ECUV1H104ZFV	0.1	
C89	ECUV1H050CCV	5P	
C200	ECUV1H390JCV	39P	
C201	ECUV1H680JCV	68P	
C202	ECUV1H121JCV	120P	
		(OTHERS)	
E101	CK15HC12G28	RINGER	
E102	CGAP1200019	MICROPHONE	
E103	PQJT10183Z	CHARGE CONTACT	S
VC1	CR01020RRT8	TRIMMER CAPACITOR	

28.3. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PQJA10075Z	TEL CORD	
A2	PQLV16BXZ	AC ADAPTOR	⚠
A3	PQQX13663Z	INSTRUCTION BOOK	
P1	PQPP10104Z	PROTECTION COVER (for BASE UNIT)	
P2	PQPP10105Z	PROTECTION COVER (for HANDSET)	
P3	PQPK14099Z	GIFT BOX	
P4	PQPD10579Z	CUSHION, AC ADAPTOR	

29. FOR SCHEMATIC DIAGRAM

29.1. Base Unit (SCHEMATIC DIAGRAM (Base Unit))

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.

Important Safety Notice: **Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer´s specified parts.**

29.2. Handset (SCHEMATIC DIAGRAM (Handset))

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.

30. SCHEMATIC DIAGRAM (Base Unit)

30.1. Base Unit

30.2. RF Unit (Base Unit)

31. SCHEMATIC DIAGRAM (Handset)

31.1. Handset

31.2. RF Unit (Handset)

31.3. Memo

32. CIRCUIT BOARD (Base Unit)

32.1. Component View

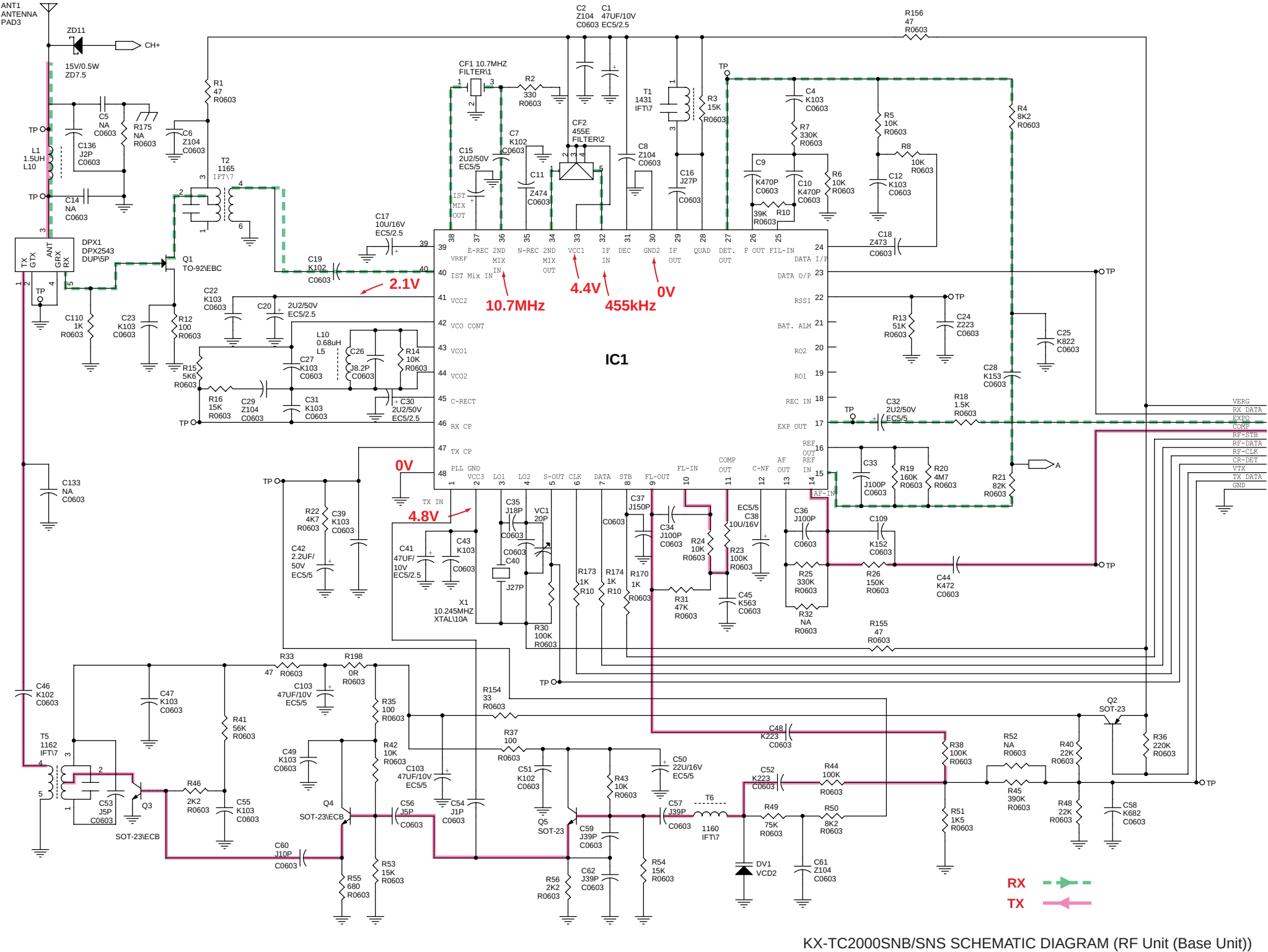
32.2. Flow Solder Side View

33. CIRCUIT BOARD (Handset)

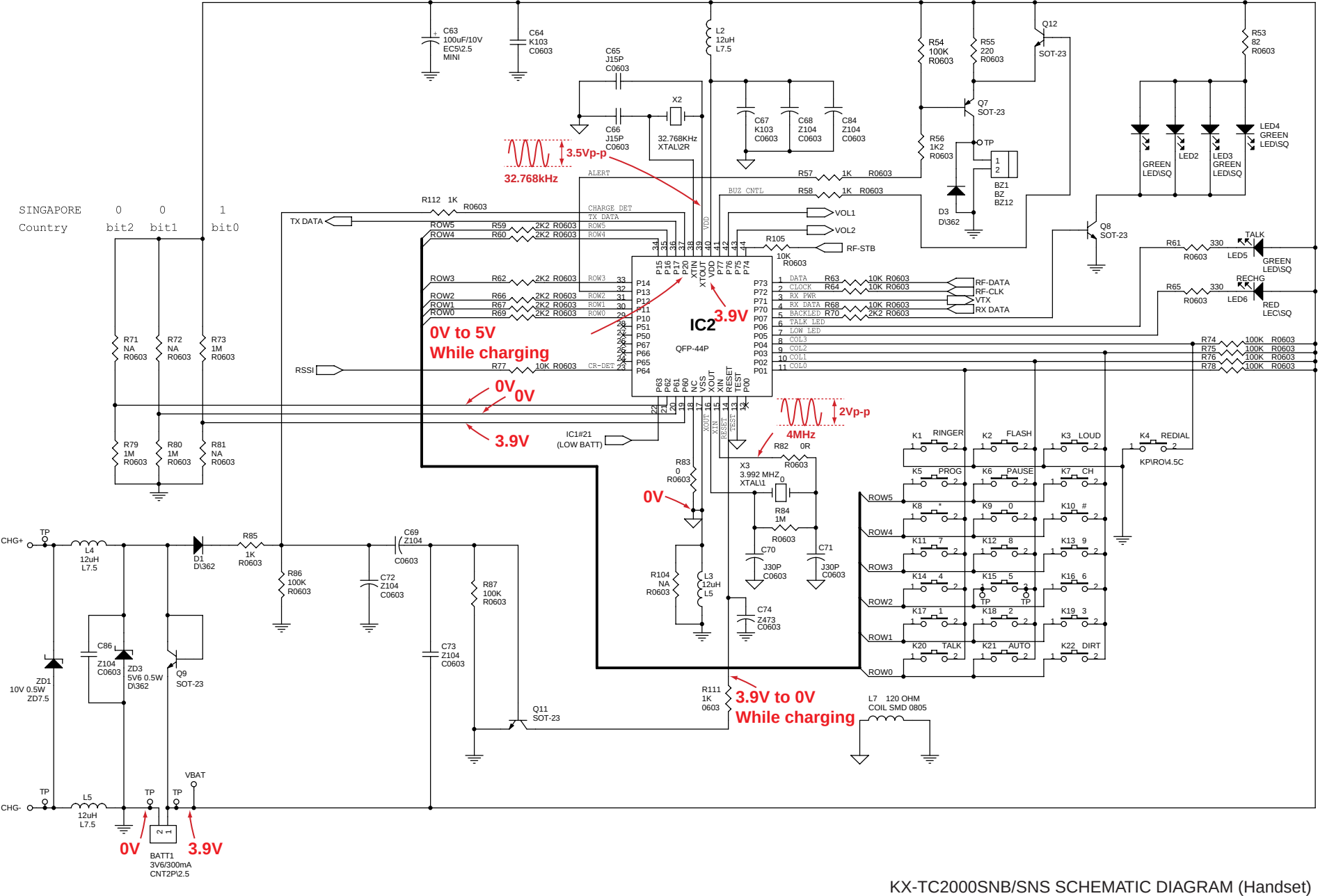
33.1. Component View

33.2. Flow Solder Side View

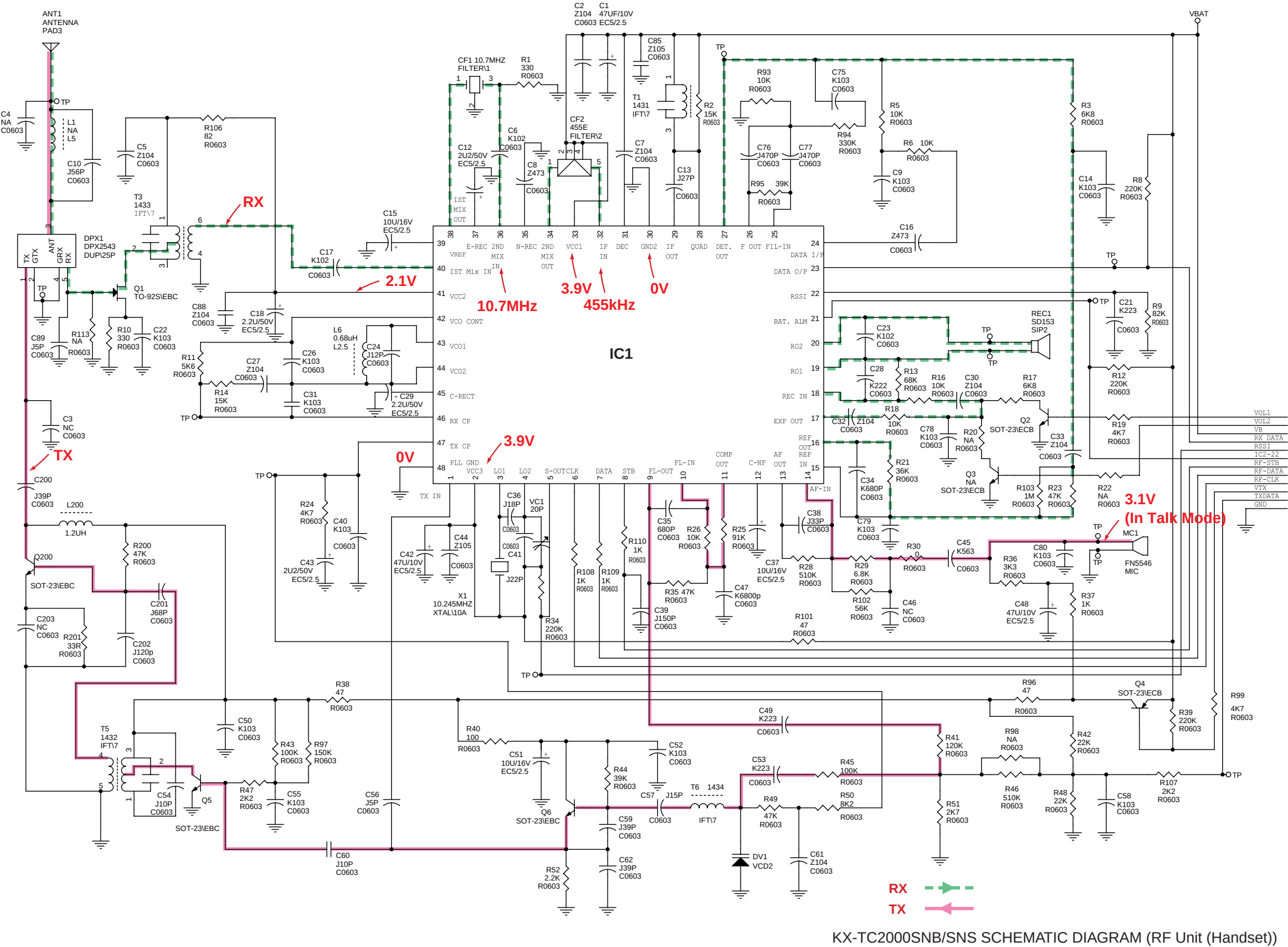
G / KXTC2000SNB / KXTC2000SNS



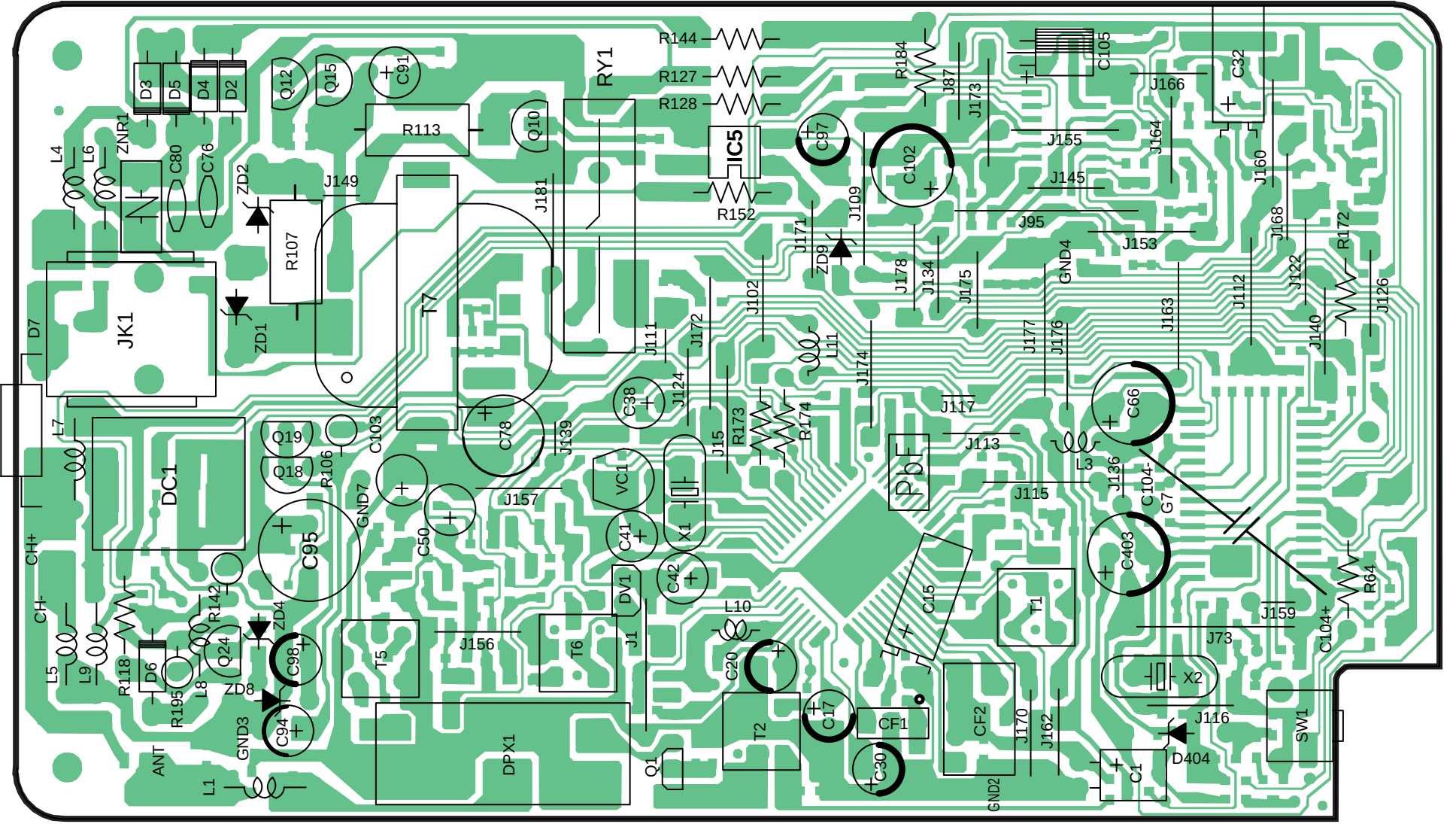
KX-TC2000SNB/SNS SCHEMATIC DIAGRAM (RF Unit (Base Unit))



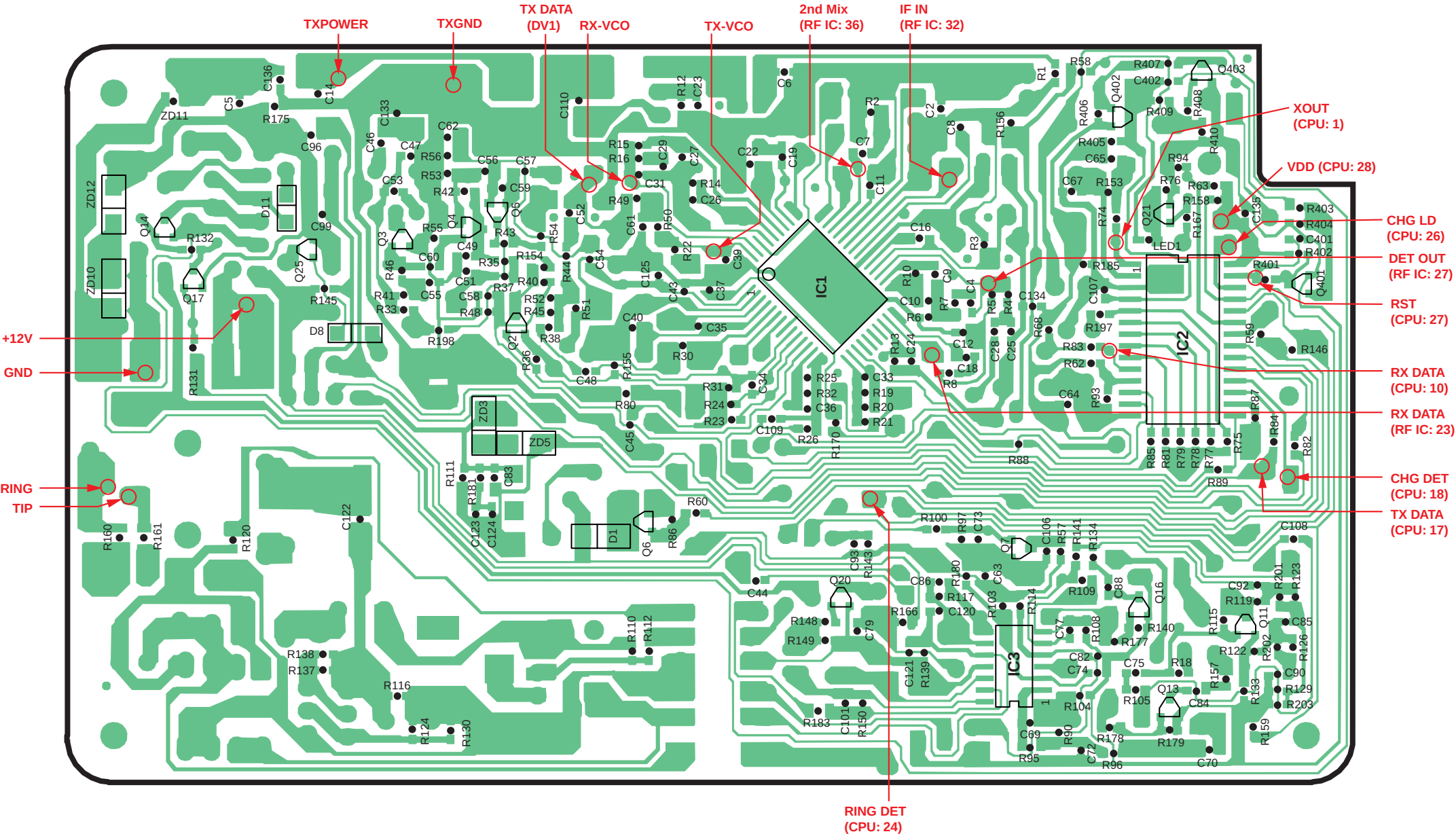
KX-TC2000SNB/SNS SCHEMATIC DIAGRAM (Handset)



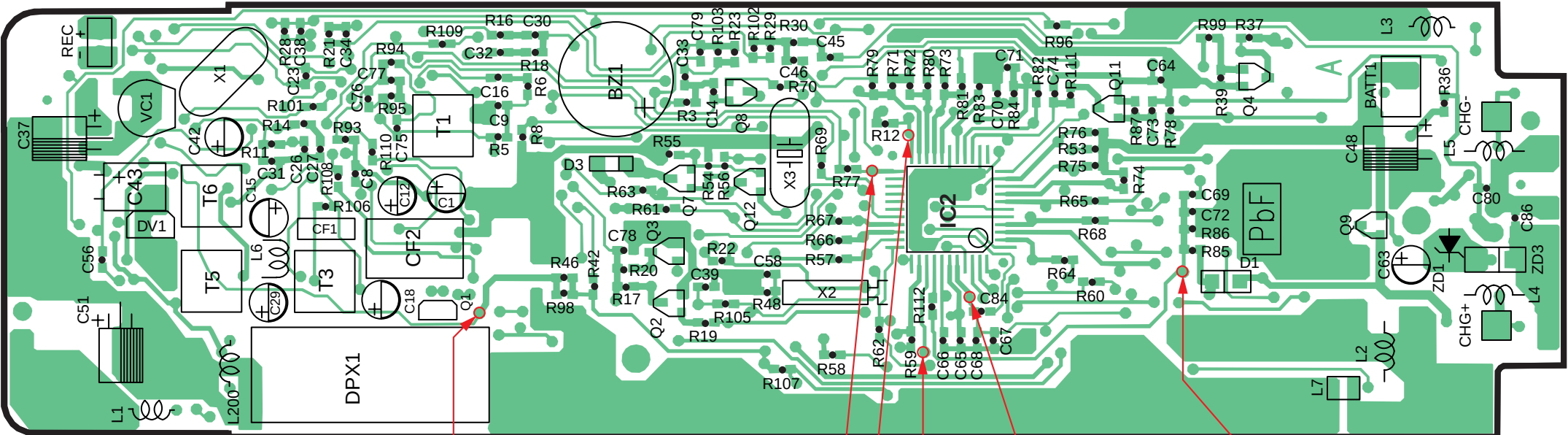
KX-TC2000SNB/SNS SCHEMATIC DIAGRAM (RF Unit (Handset))



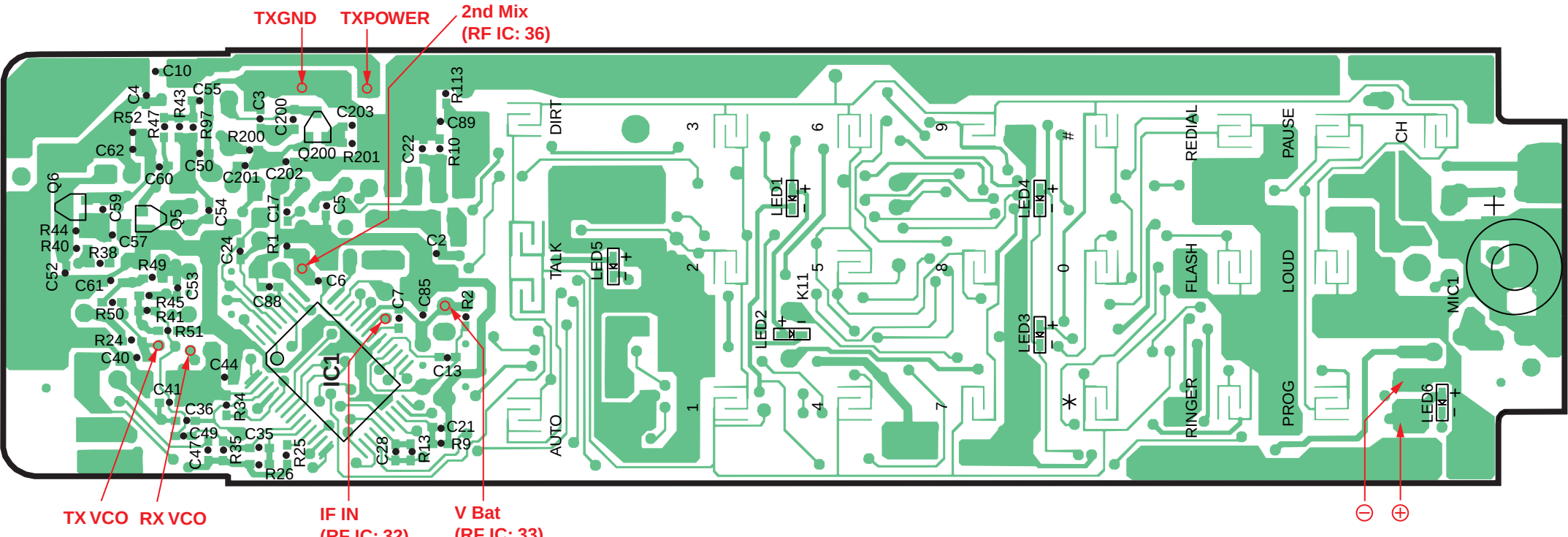
KX-TC2000SNB/SNS CIRCUIT BOARD (Component View (Base Unit))



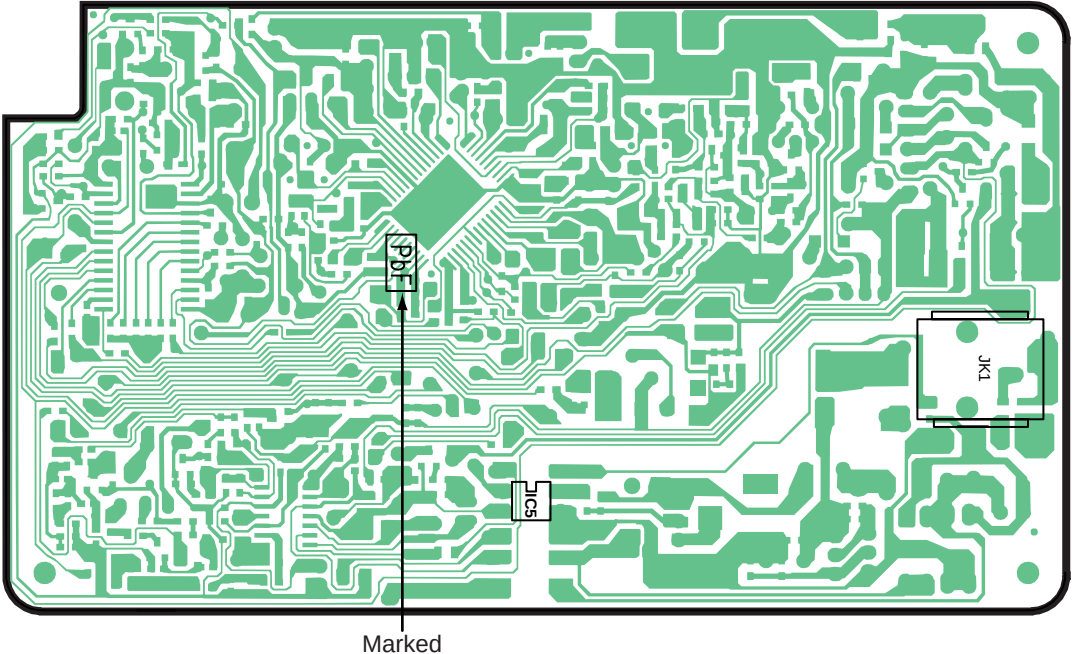
KX-TC2000SNB/SNS CIRCUIT BOARD (Flow Solder Side View (Base Unit))

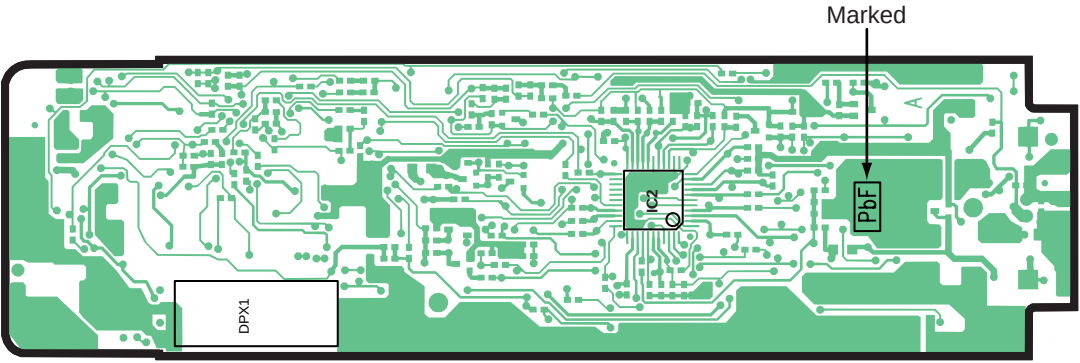


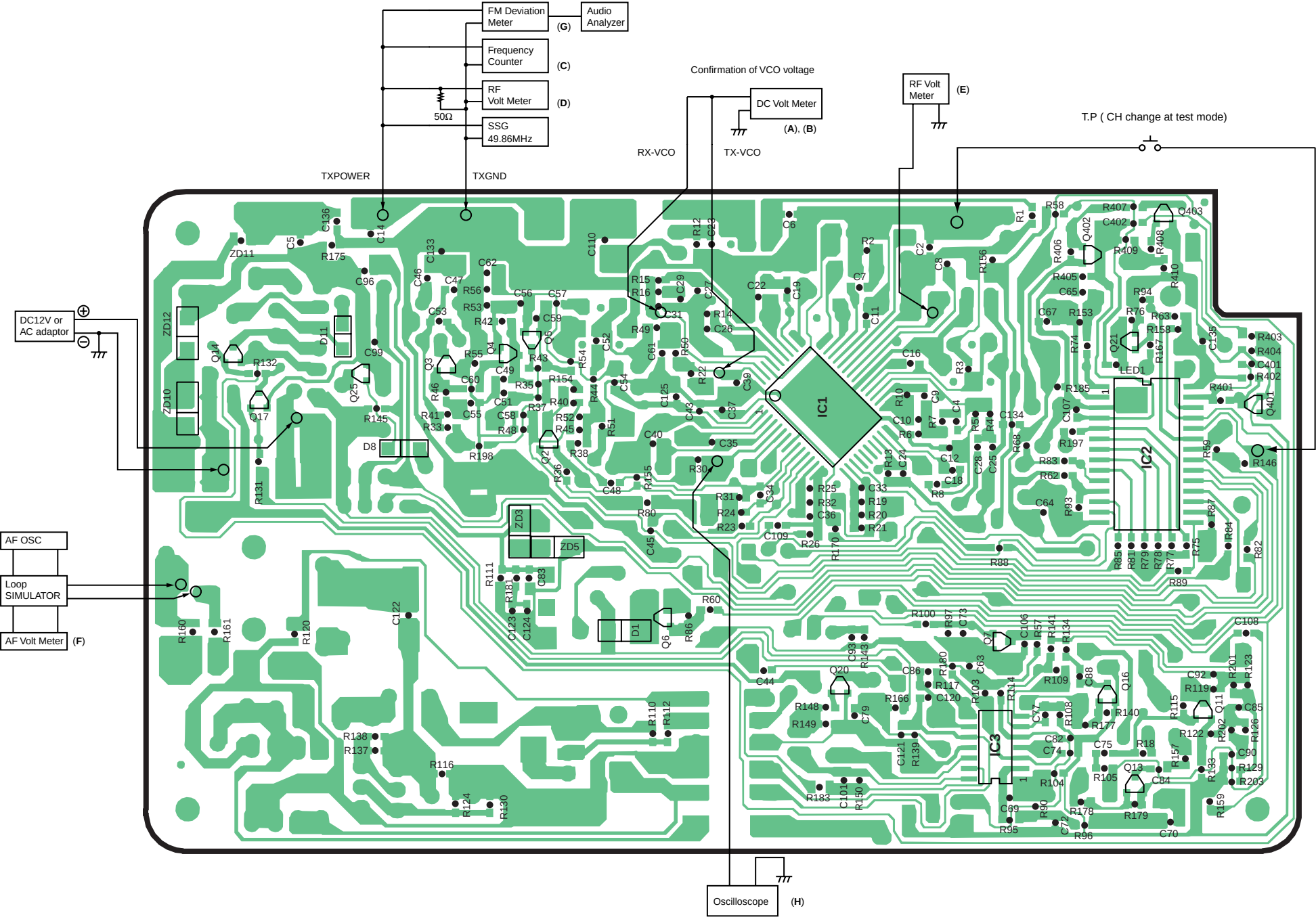
KX-TC2000SNB/SNS CIRCUIT BOARD (Component View (Handset))

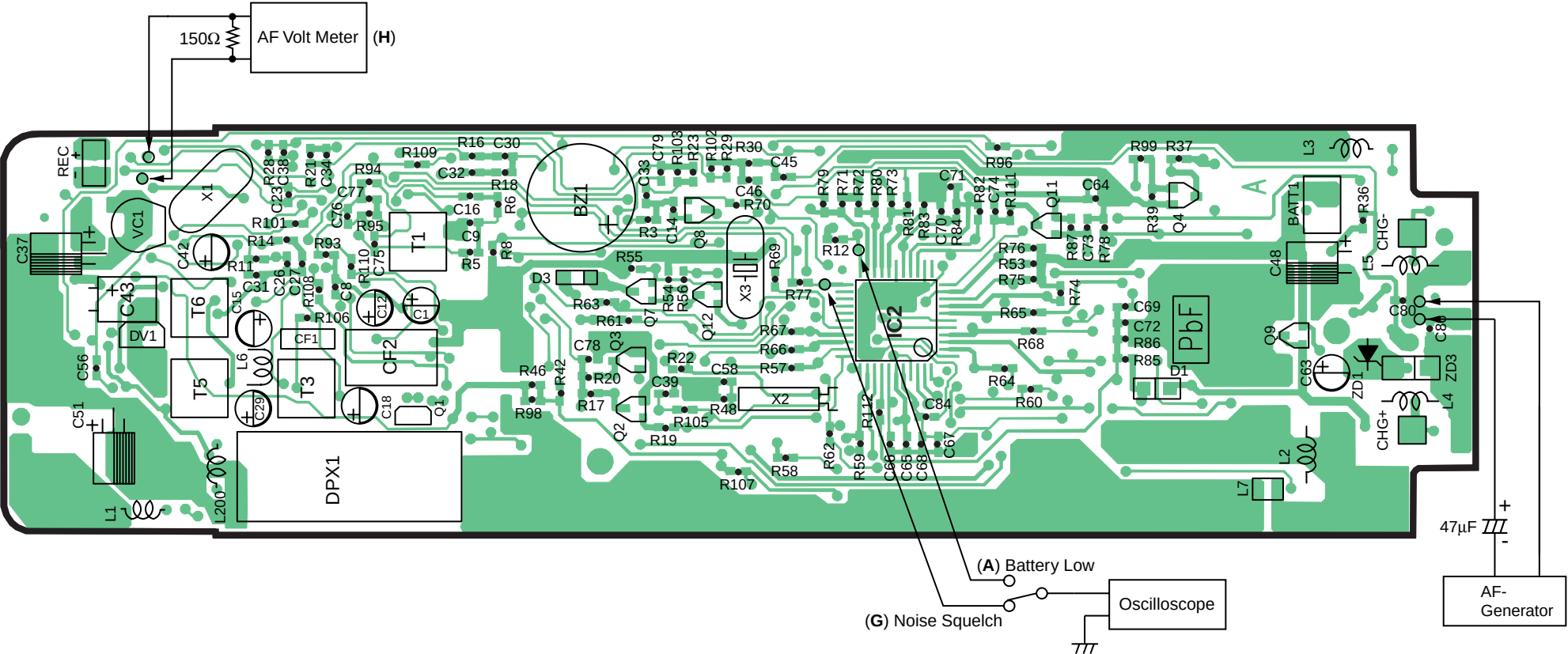


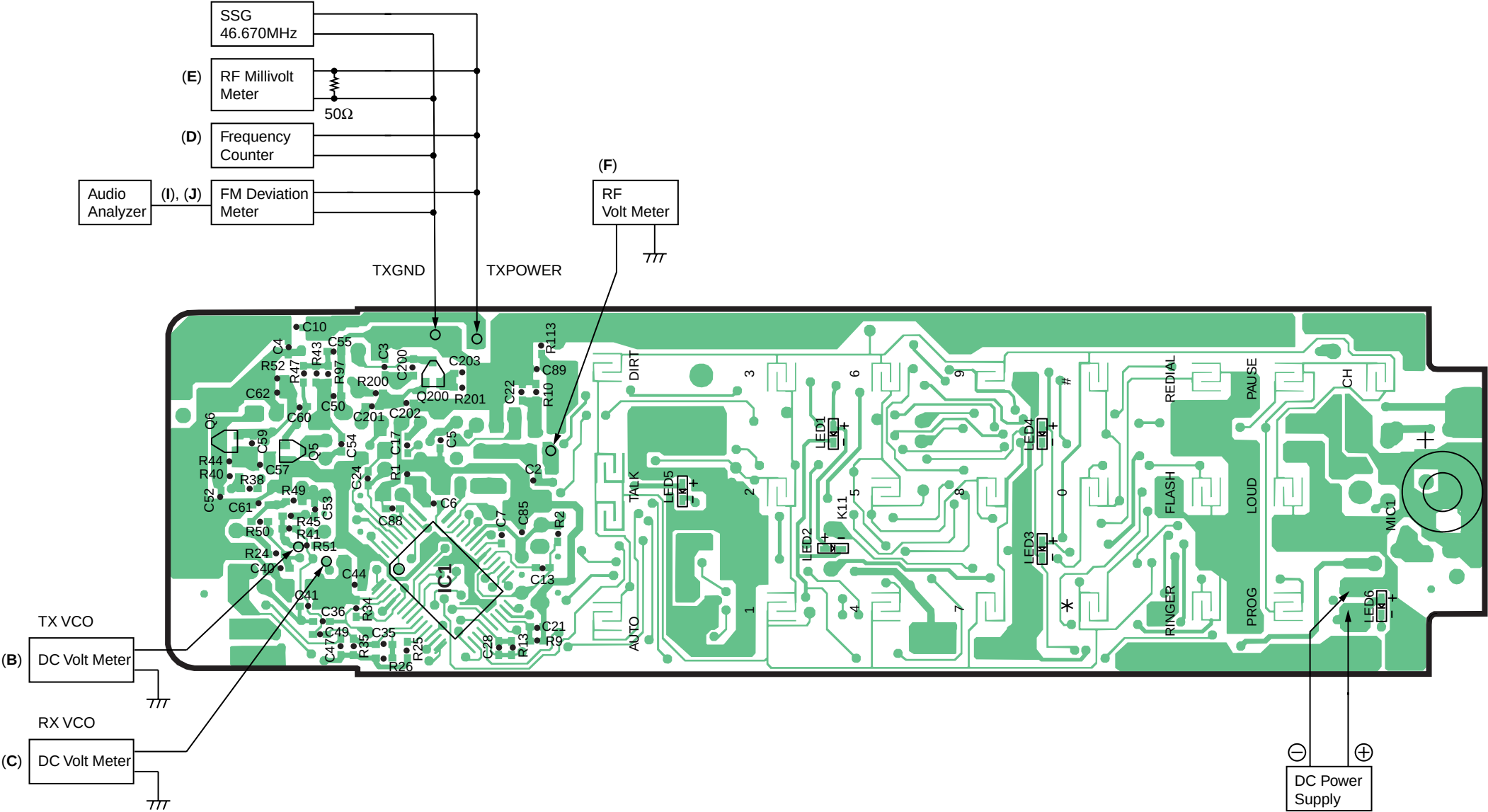
KX-TC2000SNB/SNS CIRCUIT BOARD (Flow Solder Side View (Handset))

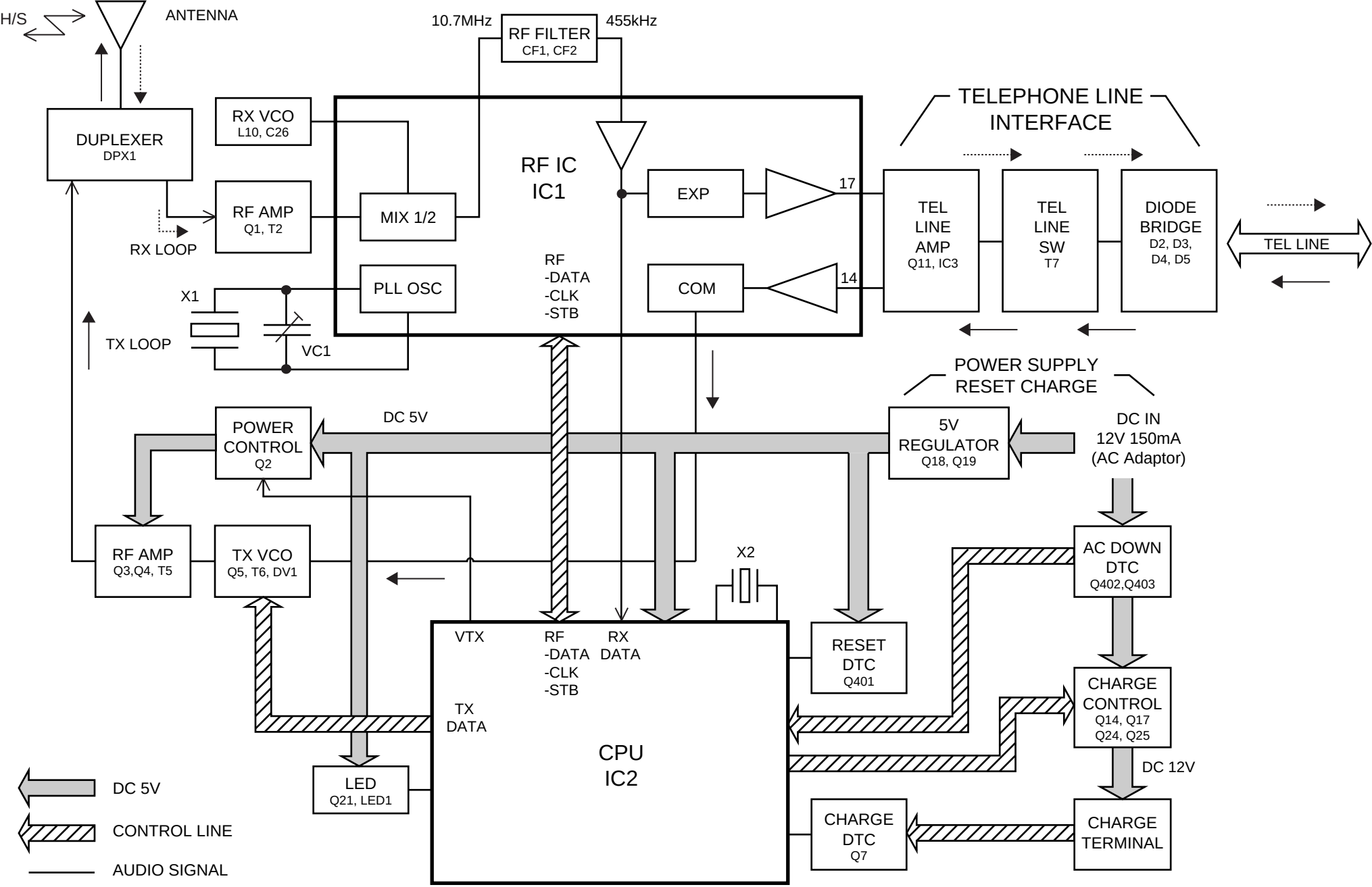

JPD1
JK1
IC5
Marked


Marked
IC2
PbF
DPX1

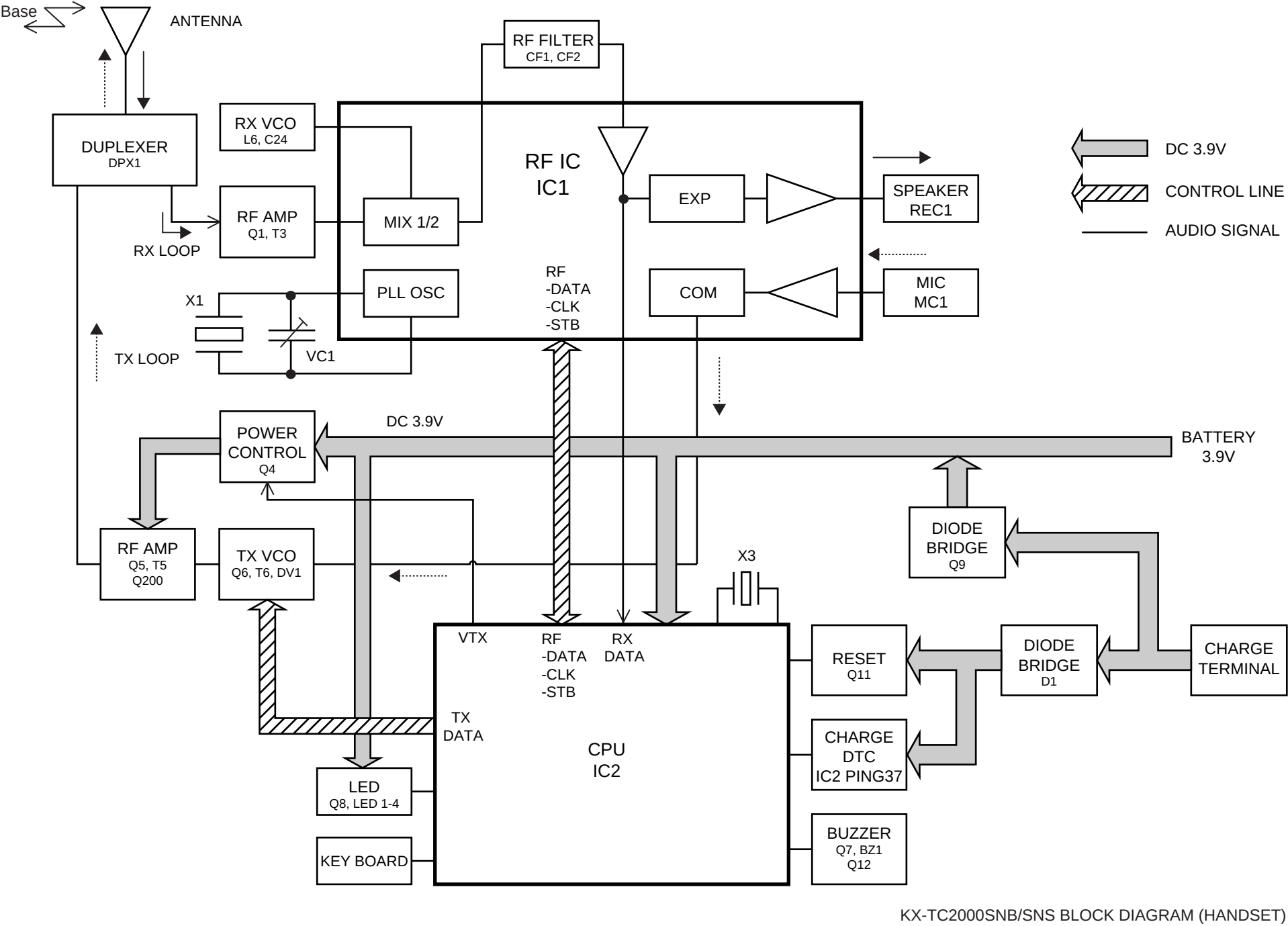

FM Deviation Meter
(G)
Audio Analyzer
Frequency Counter
(C)
RF Volt Meter
(D)
50Ω
SSG 49.86MHz
TXPOWER
TXGND
Confirmation of VCO voltage
DC Volt Meter
(A), (B)
RX-VCO
TX-VCO
RF Volt Meter
(E)
T.P (CH change at test mode)
DC12V or AC adaptor
AF OSC
Loop SIMULATOR
AF Volt Meter
(F)
Oscilloscope
(H)
IC1
IC2
IC3
LED1


150Ω
AF Volt Meter
(H)
(A) Battery Low
(G) Noise Squelch
Oscilloscope
AF-
Generator
47µF
DPX1
IC2
PbF
BZ1
BATT1
CHG-
CHG+
REC

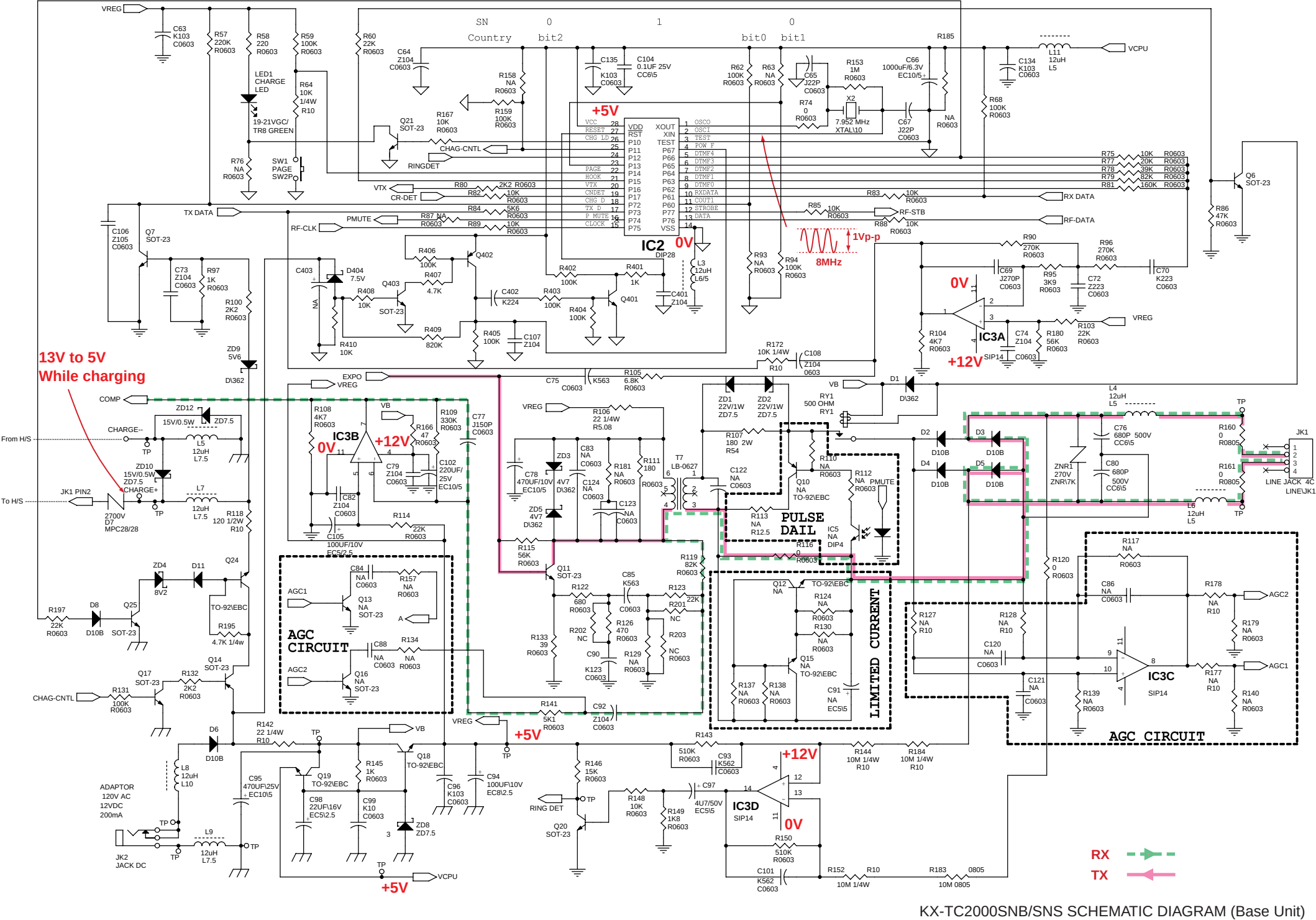

SSG
46.670MHz
(E)
RF Millivolt
Meter
50Ω
(D)
Frequency
Counter
Audio
Analyzer
(I), (J)
FM Deviation
Meter
(F)
RF
Volt Meter
TXGND
TXPOWER
TX VCO
(B)
DC Volt Meter
RX VCO
(C)
DC Volt Meter
DC Power
Supply
IC1
DIRT
TALK
AUTO
REDIAL
PAUSE
CH
FLASH
LOUD
RINGER
PROG
MIC1
LED1
LED2
LED3
LED4
LED5
LED6
K11



KX-TC2000SNB/SNS BLOCK DIAGRAM (BASE UNIT)



KX-TC2000SNB/SNS BLOCK DIAGRAM (HANDSET)



KX-TC2000SNB/SNS SCHEMATIC DIAGRAM (Base Unit)